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TO THE

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OF

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NEW YORK AND CHICAGO.
1872

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PREFACE.

THE Key is intended to indicate to pupils who study without a teacher, the forms of all the operations to be performed in the solution of the questions.

The answers being all found in the book itself, a Key, with the answers only, would add nothing. Hence, it has seemed best to place in the Key the statements, and to indicate the operations.

The Key should not be used by pupils in their daily labors in the school-room, but will be found of great use even to able and experienced teachers in large schools, where they will always want time to make statements and illustrate methods.

FISHKILL LANDING,
October, 1863.

KEY.

ROMAN NOTATION

	(1)	(2)	(3)	(4)
Ans.	XV.	XIX.	XXIX.	XXXV.

	(5)	(6)	(7)	(8)
Ans.	XLVII.	XCIX.	CLX.	CCCCXLI.

	(9)	(10)	(11)
Ans.	DLXIX.	MCVI.	MMXXV.

	(12)	(13)	(14)
Ans.	DCXCIX.	MDCCCCXXV.	MMDCLXXX.

	(15)	(16)
Ans.	MMMMDCCCCLXV.	MMDCCXCI.

	(17)	(18)
Ans.	MDCCCCXVI.	MMDCXLI.

	(19)	(20)
Ans.	MDCCCLXII.	$\overline{\text{XX}}$DXII.

EXAMPLES IN WRITING THE ORDERS OF UNITS.

	(1)	(2)	(3)	(4)	(5)
Ans.	30	80	9	8,654	90,876

	(6)	(7)	(8)	(9)
Ans.	154,970	90,813	780,571	9,023,929

	(10)	(11)	(12)
Ans.	86,981,028	1,409,060,760,503	13,800,769,703,009

	(13)	(14)	(15)
Ans.	907,400,832,106,000,201	86,981,028	169,765,432

	(1)	(2)	(3)	(4)	(5)
Ans.	105	302	519	1,004	8,701

	(6)	(7)	(8)	(9)
Ans.	40,406	58,061	99,999	406,049

	(10)	(11)	(12)	(13)
Ans.	641,721	1,421,602	9,621,016	94,807,409

	(14)	(15)
Ans.	4,000,306,909	49,000,000,949,065

(16)	(17)
990,000,000,999,990,999	409,000,000,000,000,000,209,106

EXAMPLES IN NOTATION AND NUMERATION.

	(1)	(2)	(3)	(6)	(9)
Ans.	209	5,005	12,012	100,101	47,204,851

	(10)	(11)
Ans.	6,049,072,000,407,861	899,460,850,200,506,499

	(12)	(13)	(14)
Ans.	59,059,059,059,959	12,111	9,000,000,065

(15)
Ans. 304,000,001,321,941

(16)
9,640,706,080,213

(17)
Ans. 305,104,001,045,074

(18)
80,301,006,004,620

ADDITION.

(28)
304
273
Ans. 577

(29)
3607
4082
7689

(30)
30704
471912
502616

(31)
398463
401536
799999

(32)
6
25
12
Ans. 43

(33)
30
18
25
73

(34)
143
621
124
888

(35)
800
40
6
6000
Ans. 6846

(36)
3
5
60
30
400
300
5000
4000
Ans. 9798

(37)
5000
100
3000
500
1
Ans. 8601

(38)
60
500
6000
30
400
2
40
Ans. 7032

(39)
9
70
900
Ans. 979

(40)
9
50
500
Ans. 559

(41)
8635
2194
7421
5063
2196
1245
Ans. 26754

(42)
246034
298765
47321
58653
64218
5376
9821
340
Ans. 730528

(43)
27104
32547
10758
6256
704321
730491
2787316
2749104
Ans. 7047897

(44)
1
37
39504
6890312
18757421
265
Ans. 25687540

(45)
75
1095
6435
267000
1455
27000018
270027000
Ans. 297303078

(46)
372856
404932
2704793
9078961
304165
207708
41274
375
271
34
6
Ans. 13115375

(47)
4073678
4084162
3714567
27413121
27049
87419
27413
604
37
9
Ans. 39428059

(48)
36704321
2947603
999987
76
47213694
21612090
8746
31210496
3021
Ans. 140700034

(49)
58982487654
740350540760
425703402603
34020040020
560800700500
Ans. 1819857171537

(53)
515547
340045
169054
136881
116375
115436
96838
77860
50763
46601
Ans. 1665400

APPLICATIONS.

(1)
31
28
31
30
31
30
31
31
30
31
30
31
Ans. 365 days.

(2)
112 = cost.
25 = gain.
Ans. 137 = selling price.

(3)
3650 = price.
375 = loss.
Ans. 4025 = cost.

(4)
1964 = first cost.
384 = repairs.
56 = taxes, &c.
396 = gain.
Ans. 2800 = price.

(5)
960
725
830
798
698
569
987
Ans. 5567

(6)
1800
2500
600
7500
1325
1325
1325
Ans. 16375

(7)
5 + 3 = 8 horses.
14 + 6 = 20 cows.
8 oxen.
6 + 4 + 2 = 12 colts.
20 + 16 = 36 calves.
12 + 5 = 17 young cattle.
320 sheep.
Ans. 421 = No. of animals.

A*

(8)
125 years past.
267 years to come.
Ans. 392

(9)
1861
19
Ans. 1880

(10)
45615 = real estate.
2862 = furniture.
25659 = merchandise.
9645 = cash in bank.
456 = cash on hand.
Ans. 84237 = fortune.

(11)
475 = what George paid
625 = what Samuel paid
1100 *Ans.*

(12)
750 = ground.
2000 = carpenters' work.
765 = masons' work.
265 = painters' work.
327 = miscellaneous.
Ans. 4107 = whole cost.

(13)
60 = minute.
3600 = hour.
86400 = day.
604800 = week.
2419200 = month.
31557600 = year.
Ans. 34671660

(14)
3912
1856
2011
4540
937
6338
3603
1586
2044
2951
4228
1345
1011
6138
960
607
5150
43886
617
7513
4079
743
612
2519
1238
2445
112869 *Ans*

(15)
2000000
531000
120
14000
30024
560
702
Ans 2576406

(16)
144
90
98
38
Ans. 370

(17)
999 = daughter's share.
200
1199 = son's share.
999
1199
1199
1199
Ans. 4596 = estate.

(18)
4658218
12564478
25167833
1st 3 years.
Ans. 42390529

2236889
1164796
1129217
2d 3 years.
Ans. 4530902

(19)
549005
336461
152156
142548
32292
75000
Ans. 1287462

(20)
9803
9794
15610
15787
Ans. 50994

(21)
16562 = cotton.
5690 = wheat.
25645 = flour.
10684 = corn.
35760 = tobacco.
Ans. 94341 = cargo.

(22)
51687
6077
61547
13294
11380
Ans. 143985

(23)
583169
317976
314120
994514
147545
370792
Ans. 2728116

(24)
1801
46
15
Ans. 1862

SUBTRACTION.

(22)
2637804
2376982
Ans. 260822

(23)
3762162
826541
2935621

(24)
78213609
27821890
50391719

	(25)	(26)	(27)	(28)
	30097	100247000	1000000	804367
	1654	1000409	1	27905
Ans	28443	99246591	999999	776462

	(29)	(30)	(31)	(32)
	18623041	4270492	8741209	741874
	61294	26409	728104	689346
Ans.	18561747	4244083	8013105	52528

	(33)	(34)	(35)
	65003000612	14127614916	40160042017400
	9001004006	29416000	3063000004100
Ans.	56001996606	14098198916	37097042013300

APPLICATIONS.

(1)

1565 = money lent.

450 = money due.

Ans. 1115 = money paid.

(2)

5650 = money due.

3756 = money paid.

Ans. 1894 = yet due.

	(3)	(4)	(5)	(6)
	1825	1830	1799	1838
	1815	1785	1732	1776
Ans.	10	45	67	62

	(7)	(8)	(9)
	3097394	1812	12642
	2311786	1775	7585
Ans.	785608	37	5057

	(10)	(11)	(12)	(13)
	15896	1200	6450	1799
	12264	504	4625	67
Ans.	3632	696	1825	1732

	(14)	(15)	(16)
	1863 = present year.	1776	2065
	1609	17	1986
Ans.	254	1759	79

	(17)	(18)	(19)
	515547	4338472	1855
	340045	2477667	1616
Ans.	175502	1860805	239

(20)

3500 dollars = the cost of 500 barrels.
2000 dollars = the price of 250 "
Ans. 1500 dollars = the value of 250 barrels.

(21)

5025 dollars = cost of 1675 yards.
1005 dollars = price of 335 "
Ans. 4020 dollars = cost of 1340 yards.

	(22)	(23)	(24)
	3204313	1706	9768 dollars = price.
	434495	1561	1862 dollars = gain.
Ans.	2769818	145	7906 dollars = cost.

(25)

1st house.	*2d house.*	
4760 dollars = price.	5000 dollars = price.	1265
3500 dollars = cost.	3735 dollars = cost.	1260
1260 dollars = gain.	1265 dollars = gain.	5

The greater gain was on the second house, and the difference of gain was 5 dollars.

	(26)	(27)	(28)	(29)
	19553068	23191876	75425	2306400
	3638808	2728116	49846	29875
Ans.	15914260	20463760	25579	2276525

APPLICATIONS IN ADDITION AND SUBTRACTION.

(1)

$$\begin{array}{r} 19576\\ 27580\\ 375\\ \hline 47531 \end{array} = \text{yards bought.} \qquad \begin{array}{r} 1050\\ 6974\\ 10462\\ \hline 18486 \end{array} = \text{yards sold.}$$

47531 − 18486 = 29045 = yards left, *Ans.*

(2)

355 = 1st sum borrowed.
637 = 2d " "
403 = 3d " "

1395 dollars = amount borrowed.

1395 − 977 = 418, *Ans.*

(3)

504 = James' share.
600 = John's "
725 = Henry's "

1829

2543 = fortune.
1829 = three shares.

Ans. 714 = 4th share.

(4)

$$\begin{array}{r} 275\\ 220\\ 35\\ 3675\\ \hline 4205 \end{array} \qquad \begin{array}{r} 10000\\ 4205\\ \hline \textit{Ans.}\ 5795 \end{array}$$

(5)

800 dollars for sheep.
95 dollars for oxen.
60 dollars for horse.
125 dollars for chaise.

580 dollars for all.

125 dollars for wheat.
25 dollars for cow.
40 dollars for colt.

190 dollars for all.

580 − 190 = 390 dollars in cash.

(6)

350000 dollars, bank stock.
225100 dollars, western lands.
4000 dollars, furniture.
96000 dollars, merchandise.
675100 dollars, value of property.

675100 — 450120 = 224980, *Ans.*

(7)

Sold { 125 oranges for 186 cents.
Sold { 134 oranges for 199 "
259 oranges for 385 "

489 oranges for 912 cents.
259 oranges for 385 "
Left 230 " *Ans.* 527 cost.

(8)

3204313 } blacks.
434495 } blacks.
3638808

23191876
3638808
Ans. 19553068 whites.

(9)

Gain.
367
875
1012
2254

Loss.
423
912
1335

2254
1335
Ans. 919

(10)

36 dollars for plowing.
200 dollars for fencing.
150 dollars for cultivating.
386 dollars for all.

386 dollars due.
331 dollars paid
Ans. 55 dollars yet due.

(11)

28675 dollars for sugar.
1231 dollars for freight.
29906 dollars cost.

29906 dollars cost.
1683 dollars loss.
Ans. 28223 dollars sell'g price.

(12)

269 dollars for clothing.
467 dollars for rent.
879 dollars for provisions.
146 dollars for traveling.
1761 dollars cost of all.

3467 income.
1761 expenses.
Ans. 1706 dollars left.

(13)

12140
3035
9105 = 2d man's.

346
6070
6416 = 4th man's.

6416
1821
4595 = 5th man's.

12140
9105
346
6416
4595
32602 = 5 men's.

36420 = 6 men's.
32602 = 5 men's.
Ans. 3818 = 6th man's.

(14)

22102035 = gold.
46739182 = silver.
740331 = copper.
69581548 = all.

81436165
69581548
Ans. 11854617

MULTIPLICATION.

	(16)	(17)	(18)	(19)	(20)
	104	309	149	2974	4073
	9	4	2	9	7
Ans.	936	1236	298	26766	28511

	(21)	(22)	(25)	(26)
	598	165	728056	579073
	9	9	50467	604678
Ans.	5382	1485	36742802152	350152703494

	(27)	(28)	(29)
	590587	9127089	30726
	79904	670456	97034219
Ans.	47190263648	6119311582584	2981473412994

	(30)	(31)	(32)
	870623	5965	870651
	91678538	6009	307004
Ans.	79817443789174	35843685	267293339604

	(33)	(34)
	462609	849607306
	462609	900204
Ans.	214007086881	764837595290424

	(35)	(36)
	704130496	49040697
	3301	9040709
Ans.	2324334767296	443362670734173

COMPOSITE NUMBERS.—FACTORS.

	(2)	(3)	(4)	(5)
	5709	342516	209402	937387
	6	7	8	6
	34254	2397612	1675216	5624322
	8	8	9	9
Ans.	274032	19180896	15076944	50618898

	(6)				(7)
	91738		91738		3842
	9		3		8
	825642	or	275214		30736
	9		3		3
Ans.	7430778		825642		92208
			9		6
		Ans.	7430778	*Ans.*	553248

APPLICATIONS IN THE PRECEDING RULES.

	(2)	(3)	(4)	(5)	(6)	(7)
	48	24	63	1128	3	32
	10	7	49	106	97	365
Ans.	480	168	3087	119568	291	11680

(8)		(9)				
37	75	9	12	15		18
20	49	3	3	4		123
740	3675	27	36	60	*Ans.*	2214 cost.

740 + 3675 = 4415 *Ans.*

27 + 36 + 60 = 123 acres.

	(10)	(11)	(12)	(13)
	5	786	30009	320
	3751	1252	814	1092
Ans.	18755	984072	24427326	349440

	(14)	(15)	(16)		(17)
	50	20	3000		758
	45	30	125		7
	2250	600	375000	*Ans.*	5306
	470	250	350		
Ans.	1057500	150000	131250000		

(18) (19) (20)

$$\begin{array}{lrrrr} & 27 & 37 & 1327 & 34 \\ & 20 & 20 & 365 & 8 \\ \cline{2-5} & 540 & 740 & 484355 & 272 \\ & 3 & 3 & 2 & 10 \\ \cline{2-5} \textit{Ans.} & 1620 & 2220 & 968710 & 2720 \end{array}$$

(21)

$$\begin{array}{lr} 9 - 6 = & 3 \text{ miles apart.} \\ & 8 \\ \hline & 24 \\ & 17 \\ \hline \textit{Ans.} & 408 \end{array} \qquad \begin{array}{lr} 9 + 6 = & 15 \text{ miles apart.} \\ & 8 \\ \hline & 120 \\ & 17 \\ \hline \textit{Ans.} & 2040 \end{array}$$

(22)

$$\begin{array}{lrl} & 65000 & \\ & 425 & \\ \cline{2-2} & 27625000 & \text{cost.} \\ & 9645635 & \text{paid.} \\ \cline{2-2} \textit{Ans.} & 17979365 & \text{due.} \end{array}$$

(23)

$$\begin{array}{lrl} 35 + 6 = & 41 & \text{cost per head.} \\ & 106 & \\ \cline{2-2} & 4346 & \text{cost of all.} \end{array} \qquad \begin{array}{rl} 47 & \\ 106 & \\ \cline{1-1} 4982 & \text{price.} \end{array} \qquad \begin{array}{lrl} \text{Price} & 4982 & \\ \text{Cost} & 4346 & \\ \cline{2-2} \textit{Ans.} & 636 & \text{gain.} \end{array}$$

(24)

$$\begin{array}{lr} & 23500 \\ & 815 \\ \hline \textit{Ans.} & 19152500 \end{array}$$

BILLS OF PARCELS.

New York, Oct. 1, 1854.

(25) *James Johnson* *Bought of W. Smith.*

4	Chests of tea, of 45 pounds each, at 1 dollar a pound, ...	1 × 45 × 4	$180.00
3	Firkins of butter, at 17 dollars per firkin,	17 × 3	51.00
4	Boxes of raisins, at 3 dollars per box,	3 × 4	12.00
36	Bags of coffee, at 16 dollars each, .	16 × 36	576.00
14	Hogsheads of molasses, at 28 dolls. each,	28 × 14	392.00
		Amount,	$1211.00

Received the amount in full. W. Smith.

Hartford, Nov. 1, 1854.

(26) *James Hughes* *Bought of W. Jones.*

27	Bags of coffee, at 14 dollars per bag,	14 × 27	$378.00
18	Chests of tea, at 25 dollars per chest,	25 × 18	450.00
75	Barrels of shad, at 9 dollars per bar.,	9 × 75	675.00
87	Barrels of mackerel, at 8 dolls. per bar.,	8 × 87	696.00
67	Cheeses, at 2 dollars each, . . .	2 × 67	134.00
59	Hogsheads of molasses, at 29 dollars per hogshead, ...	29 × 59	1711.00
		Amount,	$4044.00

Received the amount in full, for W. Jones.
James Cross.

DIVISION.

(23)
5) 65890
Ans. 13178

(24)
7) 609463
$87066\frac{1}{7}$

(25)
8) 3756
$469\frac{4}{8}$

(26)
7) 15840
$2262\frac{6}{7}$

(27)
3) 31680
Ans 10560

(28)
260
251
Gain 9 feet.

9) 37594
Ans. $4177\frac{1}{9}$

(29)
9) 207360
Ans. 23040

(30)
F. M. D. S.
1 + 1 + 3 + 4 = 9 persons.
9) 2943
Ans. 327

(31)
9) 544806
Ans. 60534

(1)
60) 300
Ans. 5

(2)
54) 7574
140$\frac{14}{54}$

(3)
90) 295470
3283

(4)
37) 7210449
Ans. 194877

(5)
957) 62205
65

(6)
204) 66708
327

(7)
43) 12986
Ans. 302

(8)
627) 657723
1049

(9)
16) 256
16

(10)
804) 320796
Ans. 399

(39)
63) 2645750
41996$\frac{2}{63}$

(40)
75) 15600
208

(2)
96) 68959488
Ans. 718328

(3)
270000) 1315170000000
4871000

CONTRACTIONS IN DIVISION.

(1)
3) 1260
4) 420
Ans. 105

(2)
4) 18576
12) 4644
387

(3)
9) 9576
8) 1064
133

(4)
12) 19296
8) 1608
201

(5)
4) 55728
9) 13932
4) 1548
Ans. 387

(6)
2) 92880
2) 46440
3) 23220
2) 7740
2) 3870
Ans. 1935

(7)
4) 57888
2) 14472
2) 7236
2) 3618
Ans. 1809

(8)
3) 154368
2) 51456
2) 25728
Ans. 12864

(2)
7) 956789 ÷ 56
8) 136684 . 1 1
Ans. 17085 . 4 7 × 4 = 28
True remainder, 29

(3)
9) 4870029 ÷ 72
8) 541114 . 3 3
Ans. 67639 . 2 9 × 2 = 18
True remainder, 21

(4)
11) 674201 ÷ 110
10) 61291 . 0 0
Ans. 6129 . 1 11 × 1 = 11
True remainder, 11

(5)
12) 445767 ÷ 144
12) 37147 . 3 3
Ans. 3095 . 7 12 × 7 = 84
True remainder, 87

(6)
6) 1913578 ÷ 42
7) 318929 . 4 4
Ans. 45561 . 2 6 × 2 = 12
True remainder, 16

(7)
5) 146187 ÷ 105
7) 29237 . 2 2
3) 4176 . 5 5 × 5 = 25
Ans. 1392 . 0 7 × 5 × 0 = 0
True remainder, 27

(8)
2) 26964 ÷ 110
5) 13482 . 0 0
11) 2696 . 2 2 × 2 = 4
Ans. 245 . 1 5 × 2 × 1 = 10
True remainder, 14

(9)
3) 93696 ÷ 231
7) 31232 . 0 0
11) 4461 . 5 3 × 5 = 15
Ans. 1405 . 6 7 × 3 × 6 = 126
True remainder, 141

APPLICATIONS IN THE PREVIOUS RULES.

(1)

3 + 2 = 5 children.
5) 4500
Ans. $900

(2)

240
312
Ans. 552

(3)

3475 = sum.
1162 = less.
Ans. 2313 = greater.

(4)

5760 = greater.
1475 = diff.
Ans. 4285 = less.

(5)

2025
706
Due 2731

1010
1207
Paid 2217

2731
2217
Ans. 514 yet due.

(6)

12672 = sum of votes.
316 = difference.
12356 = twice the less.

2) 12356
Ans. 6178 = less.
316
Ans. 6494 = greater.

(7)

Product of two numbers divided by one of the numbers = the other;

124) 40796
Ans. 329

(8)

425) 19125
Ans. 45

(9)

60) 5100
Ans. 85

(10 See Ex. 7.)

615) 51679680
Ans. 84032

(11)

9 × 156 = 1404 price. 1404 – 1092 = 312 gain, *Ans.*

(12)

4
14
56 cost of calves.

3
40
120 cost of sheep.

120
56
176 cost of both.

176
150
Ans. 26 loss.

(13)

12
4
48 cost of hay.

1
80
80 cost of wheat.

48
80
128 cost of both.

65
40
105 cost of horse, &c.

128
105
Cash 23 *Ans.*

(14)

The dividend equals the product of the divisor and quotient plus the remainder; hence,

45767
17
610) 45750
Ans. 75

(15)

76) 346712
Ans. 4562

(16)

482) 135442
Ans. 281

(17)

365) 31173
Ans. $85\frac{148}{365}$

(18)

35) 25000
Ans. $714\frac{10}{35}$

(19)

1500 salary.
405 saved.
1095 spent.

365) 1095
Ans. $3 per day.

(20)

25000 salary.
4925 saved.
365) 20075 spent.
Ans. 55 daily expense.

(21)

4608 selling price.
3584 cost.
512) 1024 gain.
Ans. $2 gain per barrel

(22)

35
9
315

32
6
192

315
192
507 price of cows.

507 price.
123 loss.
630 cost.

15) 630
Ans. $42

(23)

800 salary.	10000 to be possessed.
425 expenses.	2500 now possessed.
375 saved.	375) 7500 to be saved.
	Ans. 20 years.

(24)

125 men eat 125 times as much as one man in the same time; hence, the provisions will last 125 men, $\frac{1}{125}$ of 4500 days.	125) 4500 *Ans.* 36 days.

(25)

$292 \times 365 = 106580$ salary of the bishop.

$106580 \div 730 = 146 =$ No. of clergy supported.

(26)

$7912 \times 112 = 886144$ diameter of the sun.

(27)

The population of the previous year must have been less than that of 1850 by the excess of the births over the deaths; hence, $629444 - 324394 = 305050$;

$23191876 - 305050 = 22886826$ *Ans.*

(28)

$60 \times 50 = 3000$ price of 50 acres.

$18050 - 3000 = 15050$ value of remainder.

$15050 \div 50 = 301$ acres.

$301 + 50 = 351$ acres in the farm, *Ans.*

(29)

$35 \times 96 = 3360$ cost of hogshead.

$96 - 26 = 70$ remainder.

$50 \times 70 = 3500$ price obtained.

$3500 - 3360 = 140$ gain, *Ans.*

(30)

$$\begin{array}{rl} 85 \times 250 = 21250 & \text{cost of 1 farm.} \\ 70 \times \underline{175} = \underline{12250} & \text{“} \quad \text{“} \\ \text{Acres} = 425 \quad 33500 & \text{cost of 2 farms.} \end{array}$$

$75 \times 425 = 31875$ price of 2 farms.

$33500 - 31875 = 1625 =$ loss, *Ans.*

(31)

$25 + 4 + 2 = 31$ cost of one of each kind.

$279 \div 31 = 9$ of each, *Ans.*

(32)

$342 \div 2 = 171$ half of 342.

$$\left.\begin{array}{l} 171 + 14 = 185 \text{ share of one,} \\ 171 - 14 = 157 \text{ share of other,} \end{array}\right\} \textit{Ans.}$$

(33)

$$\begin{array}{rl} 4 \times 7 = 28 & \text{cost of calves.} \\ 3 \times 9 = 27 & \text{“} \quad \text{sheep.} \\ \underline{175} & \text{“} \quad \text{horse.} \\ 230 & \text{cost of all.} \end{array}$$

$125 + 65 = 190$ cost of oxen and colt.

$230 - 190 = 40$ difference for hogs.

$40 \div 8 = 5$ number of hogs bought, *Ans.*

(34)

$9 \times 368 = 3312$ value of sugar.

$3312 \div 12 = 276$ pounds of coffee, *Ans.*

(35)

$4800 \div 600 = \$8$ cost of 1 barrel.

$2172 \times 8 = 17376$ *Ans.*

(36)
$45 + 45 + 47 + 53 = 190$ yards.
$760 \div 190 = \$4$ cost of 1 yard.
$4 \times 35 = \$140$, *Ans.*

(37)
$\$4 \times 175 = \$700$ cost of sheep.
$\$85 \times 97 = \$8245$ " cattle.
$8245 - 700 = \$7545$ difference, *Ans.*

(38)
$320 - 256 = 64$ bushels unsold.
$576 - 480 = \$96$ value of unsold.
$96 \div 64 = \$1\frac{32}{64}$ value of 1 bushel, *Ans.*

(39)
$\$702 \div 117 = \$6$ cost of 1 yard.
$6 \times 76 = \$456$, *Ans.*

(40)
$2484 \div 46 = 54$ bushels on 1 acre.
$54 \times 120 = 6480$ bushels, *Ans.*

(41)
$64 \times 36 = \$2304$ cost of cattle.
$5 \times 88 = \$440$ cost of sheep.
$2304 + 440 = \$2744$ cost of both.

$40 \times 36 = \$1440$ price of cattle.
$4 \times 88 = \$352$ price of sheep.
$1440 + 352 = \$1792$ price of both.

$2744 - 1792 = \$952$ loss, *Ans.*

(42)

12530 + 11324 + 9875 = \$33729 value of houses.

33729 ÷ 3 = \$11243 daughter's share of houses.
6720 ÷ 4 = 1680 " " farm.
\$12923 daughter's share, *Ans.*

33729 − 11243 = \$22486 remainder of houses.
6720 − 1680 = 5040 " farm.
\$27526 total remainder.

27526 ÷ 2 = \$13763 = boy's share, *Ans.*

(43)

125 × 250 = \$31250 value of Jones' farm.
31250 − 20150 = \$11100 value of Cushing's farm.
11100 ÷ 185 = \$60 value of 1 acre, *Ans.*

(44)

The farm will cost 3 times as much as its one-third; hence,
\$2750 × 3 = \$8250 cost of farm, *Ans.*

(45)

14 × 24 = \$336 entire cost of pork.
One-fourth of 24 = 6 ∴ 24 − 6 = 18 remainder.

7 × 6 = \$42 price of the spoilt.
17 × 18 = 306 " " unspoilt.
\$348 price of all.

348 − 336 = \$12 = gain, *Ans.*

(46)

50000 ÷ 2 = 25000. 25000 + 1250 = 26250 cost of 5 houses
6520 × 5 = 32600 price. 32600 − 26250 = 6350 gain.
Ans. 50000 + 6350 = 56350 whole fortune.

(47)

Had the three houses been of equal value with the less, they would be worth

15850 − 850 = $15000.
15000 ÷ 3 = $5000 value of 1st and 2d.
5000 + 850 = $5850 value of 3d.

(48)

25000 + 2000 + 3500 + 4000 = $34500 fortune at the end of 4 years. By the cargo of tea the fortune was doubled; hence, 34500 × 2 = $69000, *Ans.*

PROPERTIES OF NUMBERS.

(1)
3) 9
3) 3
1

(2)
3) 15
5) 5
1

(3)
2) 24
3) 12
2) 4
2) 2
1

(4)
2) 16
2) 8
2) 4
2) 2
1

(5)
2) 18
3) 9
3) 3
1

(6)
2) 32
2) 16
2) 8
2) 4
2) 2
1

(7)
2) 48
2) 24
2) 12
2) 6
3) 3
1

(8)
7) 56
2) 8
2) 4
2) 2
1

(9)
3) 63
7) 21
3) 3
1

(10)
2) 76
2) 38
19

(1)
3) 3 . 9 . 12
1 . 3 . 4

3 is a prime divisor.

(2)
7) 21 . 63 . 84
3) 3 . 9 . 12
1 . 3 . 4

7 and 3 are prime divisors.

(3)

3) 21 . 63 . 105
7) 7 . 21 . 35
1 . 3 . 5

3 and 7 are factors.

(4)

7) 28 . 42 . 70
2) 4 . 6 . 10
2 . 3 . 5

7 and 2 = divisors.

(5)

7) 84 . 126 . 210
3) 12 . 18 . 30
2) 4 . 6 . 10
2 . 3 . 5

7, 3, and 2 = divisors.

(6)

5) 210 . 315 . 525
7) 42 . 63 . 105
3) 6 . 9 . 15
2 . 3 . 5

5, 7, and 3 are divisors.

CANCELLATION.

(3)

$$\left.\begin{matrix}\dfrac{\cancel{6}\times\cancel{7}\times\overset{3}{\cancel{9}}\times 11}{\cancel{2}\times\cancel{3}\times\cancel{7}\times\cancel{3}\times\underset{7}{\cancel{21}}} & \begin{matrix}\text{dividend}\\ \text{divisor}\end{matrix}\end{matrix}\right\} = \frac{11}{7} = 1\tfrac{4}{7} \text{ quotient, } \textit{Ans.}$$

(4)

$$\frac{\overset{1}{\cancel{4}}\times\overset{2}{\cancel{14}}\times\cancel{16}\times\overset{2}{\cancel{24}}}{\cancel{7}\times\underset{1}{\cancel{8}}\times\underset{2}{\cancel{32}}\times\cancel{12}} = \frac{1}{1} = 1, \textit{ Ans.}$$

(5)

$$\frac{\cancel{5}\times 11\times\overset{3}{\cancel{9}}\times\cancel{7}\times\overset{3}{\cancel{15}}\times\cancel{6}}{\underset{5}{\cancel{30}}\times\cancel{3}\times\underset{3}{\cancel{21}}\times\cancel{3}\times\cancel{5}} = \frac{11}{1} = 11, \textit{ Ans.}$$

(6)

$$\frac{285120 \div 8}{5184 \div 8} = \frac{35640 \div 8}{648 \div 8} = \frac{4455 \div 81}{81 \div 81} = \frac{55}{1} = 55, \textit{ Ans.}$$

(7)

$$\frac{5080320 \div 40}{635040 \div 40} = \frac{127008 \div 12}{15876 \div 12} = \frac{10584 \div 9}{1323 \div 9} = \frac{1176}{147} = 8, \text{ Ans.}$$

(8)

$$\frac{8700 \div 5}{25 \div 5} = \frac{1740 \div 5}{5 \div 5} = \frac{348}{1} = 348, \text{ Ans.}$$

(9)

$$\frac{2116 \div 2}{46 \div 2} = \frac{1058}{23} = 46, \text{ Ans.}$$

(10)

$$\frac{1512 \div 7}{42 \div 7} = \frac{216}{6} = 36, \text{ Ans.}$$

(11)

$$\frac{\overset{\cancel{3}}{\cancel{24}} \times \cancel{28} \times \overset{16}{\cancel{32}} \times 49 \times \overset{9}{\cancel{81}}}{\cancel{8} \times \cancel{4} \times \cancel{7} \times \cancel{9} \times \underset{\underset{1}{\cancel{2}}}{\cancel{6}}} = 7056, \text{ Ans.}$$

(12)

$$\frac{\overset{16}{\cancel{48}} \times \overset{5}{\cancel{25}}}{\underset{\underset{1}{\cancel{3}}}{\cancel{15}}} = \frac{80}{1} = 80, \text{ Ans.}$$

(13)

$$\frac{\cancel{14} \times 26 \times \cancel{3}}{\underset{\underset{1}{\cancel{3}}}{\cancel{42}}} = \frac{26}{1} = 26, \text{ Ans.}$$

(14)

$$\frac{11 \times \overset{11}{\cancel{33}} \times \cancel{2}}{\underset{\underset{3}{\cancel{9}}}{\cancel{18}}} = \frac{121}{3} = 40\tfrac{1}{3}, \text{ Ans.}$$

(15)

$$\frac{7 \times \overset{\overset{4}{\cancel{8}}}{\cancel{56}}}{\underset{\underset{3}{\cancel{6}}}{\cancel{42}}} = \frac{28}{3} = 9\tfrac{1}{3}, \text{ Ans.}$$

(16)

$$\frac{\overset{5}{\cancel{125}} \times \overset{8}{\cancel{48}}}{\underset{\underset{1}{\cancel{6}}}{\cancel{150}}} = \frac{40}{1} = 40, \text{ Ans.}$$

(17)

$$\frac{\cancel{6} \times \overset{57}{\cancel{342}}}{\underset{\underset{1}{\cancel{6}}}{\cancel{36}}} = \frac{57}{1} = 57, \text{ Ans.}$$

(18)

$$\frac{\overset{441}{1323}\times5}{\underset{147}{\cancel{441}}}=\frac{\overset{3}{\cancel{441}}}{\cancel{147}}\times5=3\times5=15$$

(19)

$$\frac{\cancel{9}\times\overset{\overset{25}{\cancel{100}}}{\cancel{200}}\times3}{\underset{\cancel{2}}{\cancel{18}}\times\underset{14}{\cancel{56}}}=\frac{75}{14}=5\frac{5}{14},\ \textit{Ans.}$$

(20)

$$\frac{\cancel{12}\times\overset{29}{\cancel{145}}\times\overset{2}{\cancel{4}}}{\underset{1}{\cancel{5}}\times\underset{\cancel{2}}{\cancel{24}}}=\frac{58}{1}=58,\ \textit{Ans.}$$

(21)

$$\frac{\cancel{6}\times\overset{4}{\cancel{8}}}{\underset{\underset{1}{\cancel{2}}}{\cancel{12}}}=\frac{4}{1}=4,\ \textit{Ans.}$$

(22)

$$\frac{\cancel{3}\times\cancel{2}\times\overset{3}{\cancel{15}}}{1\times\underset{\underset{1}{\cancel{6}}}{\cancel{30}}}=\frac{3}{1}=3,\ \textit{Ans.}$$

LEAST COMMON MULTIPLE.

(1)

$$\begin{array}{r|l}2 & 3\ .\ 4\ .\ 8\\ \hline 2 & 3\ .\ 2\ .\ 4\\ \hline & 3\ .\ 1\ .\ 2\end{array}$$

$2\times2\times3\times2=24$, *Ans.*

(2)

$$\begin{array}{r|l}3 & 3\ .\ 8\ .\ 9\\ \hline & 1\ .\ 8\ .\ 3\end{array}$$

$3\times8\times3=72$, *Ans.*

(3)

$$\begin{array}{r|l}2 & 6\ .\ 7\ .\ 8\ .\ 10\\ \hline & 3\ .\ 7\ .\ 4\ .\ 5\end{array}$$

$2\times3\times7\times4\times5=840$, *Ans.*

(4)

$$\begin{array}{r|l}7 & 21\ .\ 49\\ \hline & 3\ .\ 7\end{array}$$

$7\times3\times7=147$, *Ans.*

(5)

$$\begin{array}{rl} 2) & \underline{2 . 7 . 5 . 6 . 8} \\ & 1 . 7 . 5 . 3 . 4 \end{array}$$

$2\times7\times5\times3\times4 = 840$, *Ans.*

(6)

$$\begin{array}{rl} 2) & \underline{4 . 14 . 28 . 98} \\ 2) & \underline{2 . 7 . 14 . 49} \\ 7) & \underline{1 . 7 . 7 . 49} \\ & 1 . 1 . 1 . 7 \end{array}$$

$2\times2\times7\times7 = 196$, *Ans.*

(7)

$13 \times 6 = 78$, *Ans.*

(8)

$$\begin{array}{rl} 2) & \underline{12 . 4 . 7} \\ 2) & \underline{6 . 2 . 7} \\ & 3 . 1 . 7 \end{array}$$

$2\times2\times3\times7 = 84$, *Ans.*

(9)

$$\begin{array}{rl} 3) & \underline{6 . 9 . 4 . 14 . 16} \\ 2) & \underline{2 . 3 . 4 . 14 . 16} \\ 2) & \underline{1 . 3 . 2 . 7 . 8} \\ & 1 . 3 . 1 . 7 . 4 \end{array}$$

$3\times2\times2\times3\times7\times4 = 1008$, *Ans.*

(10)

$$\begin{array}{rl} 2) & \underline{13 . 12 . 4} \\ 2) & \underline{13 . 6 . 2} \\ & 13 . 3 . 1 \end{array}$$

$2\times2\times13\times3 = 156$, *Ans*

GREATEST COMMON DIVISOR.

(1)

$24 = 2 \times 2 \times 2 \times 3$

$30 = 2 \times 3 \times 5$

2 and 3 are common.

$2 \times 3 = 6$, *Ans.*

(2)

$9 = 3 \times 3$

$18 = 3 \times 3 \times 2$

3 and 3 are common.

$3 \times 3 = 9$, *Ans.*

(3)

$6 = 3 \times 2$

$12 = 3 \times 2 \times 2$

$30 = 3 \times 2 \times 5$

3 and 2 are common.

$3 \times 2 = 6$, *Ans.*

(4)

$15 = 5 \times 3$

$25 = 5 \times 5$

$30 = 5 \times 3 \times 2$

5 is common.

$5 =$ *Ans.*

(5)

$12 = 2 \times 2 \times 3$

$18 = 2 \times 3 \times 3$

$72 = 2 \times 2 \times 2 \times 3 \times 3$

2 and 3 are common.

$2 \times 3 = 6$, *Ans.*

(6)

$25 = 5 \times 5$

$35 = 5 \times 7$

$70 = 5 \times 7 \times 2$

5 is common.

$5 =$ *Ans.*

(7)

$28 = 2 \times 2 \times 7$

$42 = 2 \times 3 \times 7$

$70 = 2 \times 5 \times 7$

2 and 7 are common.

$2 \times 7 = 14$, *Ans.*

(8)

$84 = 2 \times 2 \times 3 \times 7$

$126 = 2 \times 3 \times 3 \times 7$

$210 = 2 \times 5 \times 3 \times 7$

2, 3 and 7 are common.

$2 \times 3 \times 7 = 42$, *Ans.*

(1)

216) 408 (1
216
192) 216 (1
192
24) 192 (8
192

24 = greatest com. divisor = *Ans.*

(2)

408) 740 (1
408
332) 408 (1
332
76) 332 (4
304
28) 76 (2
56
20) 28 (1
20
8) 20 (2
16
4) 8 (2
8

4 = greatest com. divisor = *Ans.*

(3)

315) 810 (2
630
180) 315 (1
180
135) 180 (1
135
45) 135 (3
135

45 = gt. com. div. = *Ans.*

(4)

4410) 5670 (1
4410
1260) 4410 (3
3780
630) 1260 (2
1260

630 = gt. com. div. = *Ans.*

(5)

1869) 3471 (1
1869
1602) 1869 (1
1602
267) 1602 (6
1602

267 = gt. com. div. = *Ans.*

(6)

1584) 2772 (1
1584
1188) 1584 (1
1188
396) 1188 (3
1188

396 = gt. com. div. = *Ans.*

(7)

492) 744 (1
492
252) 492 (1
252
240) 252 (1
240
12) 240 (20
240

12) 1044 (87
96
84
84

12 = greatest common divisor = *Ans.*

(8)

944) 1488 (1
944
544) 944 (1
544
400) 544 (1
400
144) 400 (2
288
112) 144 (1
112
32) 112 (3
96
16) 32 (2
32

16) 2088 (130
16
48
48
8) 16 (2
16

8 = greatest common divisor = *Ans.*

(9)

216) 408 (1
216
192) 216 (1
192
24) 192 (8
192

24) 740 (3
72
20) 24 (1
20
4) 20 (5
20

4 = greatest common divisor = *Ans.*

(10)

945) 1560 (1
945
615) 945 (1
615
330) 615 (1
330
285) 330 (1
285
45) 285 (6
270
15) 45 (3
45

15) 22683 (1512
15
76
75
18
15
33
30
3) 15 (5
15

3 = greatest common divisor = *Ans.*

COMMON FRACTIONS.

REDUCTION OF FRACTIONS.

(1)
$12 \times 9 = 108$
$\frac{108}{9}$ = *Ans.*

(2)
$46 \times 15 = 690$
$\frac{690}{15}$ = *Ans.*

(3)
$26 \times 7 = 182$
$\frac{182}{7}$ = *Ans.*

(4)
$178 \times 40 = 7120$
$\frac{7120}{40}$ = *Ans.*

(5)
$240 \times 114 = 27360$
$\frac{27360}{114}$ = *Ans.*

(6)
$54 \times 4 = 216$
$\frac{216}{4}$ = *Ans.*

(7)
$96 \times 4 = 384$
$\frac{384}{4}$ = *Ans.*

(8)
$426 \times 16 = 6816$
$\frac{6816}{16}$ = *Ans.*

(1)

$$\begin{array}{l} 47\frac{5}{6} = \frac{287}{6} \\ \underline{6} \\ \underline{287} \\ 6 \end{array}$$

(2)

$$\begin{array}{l} 17\frac{3}{8} = \frac{139}{8} \\ \underline{8} \\ \underline{139} \\ 8 \end{array}$$

(3)

$$\begin{array}{l} 42\frac{9}{20} = \frac{849}{20} \\ \underline{20} \\ \underline{849} \\ 20 \end{array}$$

(4)

$$\begin{array}{l} 625\frac{4}{13} = \frac{8129}{13} \\ \underline{13} \\ \underline{8129} \\ 13 \end{array}$$

(5)

$$\begin{array}{l} 205\frac{46}{112} = \frac{23006}{112} \\ \underline{112} \\ \underline{23006} \\ 112 \end{array}$$

(6)

$$\begin{array}{l} 84\frac{17}{24} = \frac{2033}{24} \\ \underline{24} \\ \underline{2033} \\ 24 \end{array}$$

(7)

$$\begin{array}{l} 15\frac{142}{365} = \frac{5617}{365} \\ \underline{365} \\ \underline{5617} \\ 365 \end{array}$$

(8)

$$\begin{array}{l} 916\frac{450}{600} = \frac{550050}{600} \\ \underline{600} \\ \underline{550050} \\ 600 \end{array}$$

(9)

$$\begin{array}{l} 25\frac{9}{76} = \frac{1909}{76} \\ \underline{76} \\ \underline{1909} \\ 76 \end{array}$$

$$\begin{array}{l} 156\frac{22}{60} = \frac{9382}{60} \\ \underline{60} \\ \underline{9382} \\ 60 \end{array}$$

(2)

$$\begin{array}{l} \frac{99}{8} \\ 8\,\underline{)\,99} = 12\frac{3}{8} \\ \,12\frac{3}{8} \end{array}$$

(3)

$$\begin{array}{l} \frac{19}{7} \\ 7\,\underline{)\,19} = 2\frac{5}{7} \\ \,2\frac{5}{7} \end{array}$$

(4)

$$\begin{array}{l} \frac{51}{9} \\ 9\,\underline{)\,51} = 5\frac{6}{9} \\ \,5\frac{6}{9} \end{array}$$

(5)

$$\begin{array}{l} \frac{15}{3} \\ 3\,\underline{)\,15} = 5 \\ \,5 \end{array}$$

(6)

$$\begin{array}{l} \frac{327}{125}\,\big)\,\underline{327} = 2\frac{77}{125} \\ \qquad\quad 2\frac{77}{125} \end{array} \qquad \begin{array}{l} \frac{3672}{153}\,\big)\,\underline{3672} = 24 \\ \qquad\qquad 24 \end{array}$$

$$\begin{array}{l} \frac{50287}{6941}\,\big)\,\underline{50287} = 7\frac{1700}{6941} \\ \qquad\qquad 7\frac{1700}{6941} \end{array} \qquad \begin{array}{l} \frac{987625}{72301}\,\big)\,\underline{987625} = 13\frac{47712}{72301} \\ \qquad\qquad 13\frac{47712}{72301} \end{array}$$

(7) (8)

$$\begin{array}{l} \frac{878}{4}\,\big)\,\underline{878} = 219\frac{2}{4} \\ \qquad\quad 219\frac{2}{4} \end{array} \qquad \begin{array}{l} \frac{62587}{3114}\,\big)\,\underline{62587} = 20\frac{307}{3114} \\ \qquad\qquad 20\frac{307}{3114} \end{array}$$

$$\begin{array}{l} \frac{4927}{109}\,\big)\,\underline{4927} = 45\frac{22}{109} \\ \qquad\quad 45\frac{22}{109} \end{array} \qquad \begin{array}{l} \frac{2641674}{278436}\,\big)\,\underline{2641674} = 9\frac{135750}{278436} \\ \qquad\qquad 9\frac{135750}{278436} \end{array}$$

(9)

$$\begin{array}{l} \frac{147254149}{4674}\,\big)\,\underline{147254149} = 31504\frac{4453}{4674} \\ \qquad\qquad 31504\frac{4453}{4674} \end{array}$$

$$\begin{array}{l} \frac{145260}{108}\,\big)\,\underline{145260} = 1345 \\ \qquad\qquad 1345 \end{array} \qquad \begin{array}{l} \frac{62015735}{7803}\,\big)\,\underline{62015735} = 7947\frac{5294}{7803} \\ \qquad\qquad 7947\frac{5294}{7803} \end{array}$$

(1) (2)

$$\frac{12 \div 3}{15 \div 3} = \frac{4}{5},\ \textit{Ans.} \qquad \frac{18 \div 3}{24 \div 3} = \frac{6 \div 2}{8 \div 2} = \frac{3}{4},\ \textit{Ans.}$$

(3)

$$\frac{27 \div 3}{36 \div 3} = \frac{9 \div 3}{12 \div 3} = \frac{3}{4},\ \textit{Ans.}$$

(4)

$$\frac{36 \div 2}{144 \div 2} = \frac{18 \div 2}{72 \div 2} = \frac{9 \div 9}{36 \div 9} = \tfrac{1}{4}, \textit{ Ans.}$$

(5)

Greatest common divisor of 84 and 96 = 12.

$$\frac{84 \div 12}{96 \div 12} = \tfrac{7}{8}, \textit{ Ans.}$$

(6)

Greatest common divisor of 144 and 864 = 144.

$$\frac{144 \div 144}{864 \div 144} = \tfrac{1}{6}, \textit{ Ans.}$$

(7)

Greatest common divisor of 288 and 2592 = 288.

$$\frac{288 \div 288}{2592 \div 288} = \tfrac{1}{9}, \textit{ Ans.}$$

(8)

Greatest common divisor of 85 and 165 = 5.

$$\frac{85 \div 5}{165 \div 5} = \tfrac{17}{33}, \textit{ Ans.}$$

(9)

Greatest common divisor of 175 and 375 = 25.

$$\frac{175 \div 25}{375 \div 25} = \tfrac{7}{15}, \textit{ Ans.}$$

(10)

$$\frac{104 \div 2}{312 \div 2} = \frac{52 \div 2}{156 \div 2} = \frac{26 \div 13}{78 \div 13} = \frac{2 \div 2}{6 \div 2} = \tfrac{1}{3}, \textit{ Ans.}$$

(11)

$$\frac{1049 \div 1049}{8392 \div 1049} = \tfrac{1}{8}, \textit{ Ans.}$$

(12)

$$\frac{275 \div 55}{440 \div 55} = \tfrac{5}{8}, \textit{ Ans.}$$

(13)

$$\frac{351 \div 3}{795 \div 3} = \frac{117}{265},\ \textit{Ans.}$$

(14)

$$\frac{172 \div 86}{1118 \div 86} = \frac{2}{13},\ \textit{Ans.}$$

(15)

$$\frac{63 \div 9}{81 \div 9} = \frac{7}{9},\ \textit{Ans.}$$

(16)

$$\frac{315 \div 45}{405 \div 45} = \frac{7}{9},\ \textit{Ans.}$$

(1)

$$\tfrac{1}{2} \text{ of } \tfrac{1}{3} \text{ of } \tfrac{5}{7} = \frac{1\times1\times5}{2\times3\times7} = \frac{5}{42},\ \textit{Ans.}$$

(2)

$$\tfrac{5}{3} \text{ of } \tfrac{3}{6} \text{ of } \tfrac{6}{7} = \frac{5\times3\times6}{3\times6\times7} = \frac{90}{126},\ \textit{Ans.}$$

(3)

$$\tfrac{6}{8} \text{ of } \tfrac{8}{9} \text{ of } \tfrac{9}{15} = \frac{6\times8\times9}{8\times9\times15} = \frac{432}{1080} = \frac{2}{5},\ \textit{Ans.}$$

(4)

$$2\tfrac{1}{4} \text{ of } 6\tfrac{1}{2} \text{ of } 7 = \frac{9\times13\times7}{4\times2\times1} = \frac{819}{8},\ \textit{Ans.}$$

(5)

$$5 \text{ of } \tfrac{1}{2} \text{ of } \tfrac{1}{7} \text{ of } 6 = \frac{5\times1\times1\times6}{1\times2\times7\times1} = \frac{30}{14},\ \textit{Ans.}$$

(6)

$$6\tfrac{1}{3} \text{ of } 7\tfrac{1}{4} \text{ of } 6\tfrac{31}{27} = \frac{19\times29\times193}{3\times4\times27} = \frac{106343}{324},\ \textit{Ans.}$$

METHOD BY CANCELING.

(2)

$$\frac{5}{\cancel{3}} \text{ of } \frac{\cancel{3}}{\cancel{6}} \text{ of } \frac{\cancel{6}}{7} = \frac{5}{7}, \text{ \textit{Ans.}}$$

(3)

$$\frac{3}{4} \text{ of } \frac{\cancel{5}}{8} \text{ of } \frac{\cancel{5}}{\cancel{9}} \text{ of } \frac{\overset{3}{\cancel{27}}}{\underset{\underset{4}{\cancel{20}}}{\cancel{100}}} \text{ of } \frac{5}{13} = \frac{45}{1664}, \text{ \textit{Ans.}}$$

(4)

$$\frac{\overset{\overset{2}{\cancel{6}}}{\cancel{42}}}{\underset{11}{\cancel{110}}} \text{ of } \frac{\cancel{3}}{19} \text{ of } \frac{\overset{\cancel{4}}{\cancel{40}}}{\underset{\underset{\cancel{3}}{\cancel{27}}}{\cancel{108}}} \text{ of } \frac{\cancel{3}}{\cancel{7}} = \frac{2}{209}, \text{ \textit{Ans}}$$

(5)

$$3\tfrac{3}{8} = \left(\frac{\overset{3}{\cancel{27}}}{8}\right) \text{ of } \frac{\cancel{5}}{\cancel{9}} \text{ of } \frac{\overset{3}{\cancel{27}}}{\underset{\underset{\cancel{5}}{\cancel{35}}}{\cancel{315}}} \text{ of } \frac{\overset{7}{\cancel{49}}}{1} = \frac{63}{8} = 7\tfrac{7}{8}, \text{ \textit{Ans.}}$$

(6)

$$\frac{\cancel{5}}{12} \text{ of } 6\tfrac{1}{2} = \left(\frac{13}{\cancel{2}}\right) \text{ of } \frac{\overset{13}{\cancel{26}}}{\underset{3}{\cancel{15}}} = \frac{169}{36} = 4\tfrac{25}{36}, \text{ \textit{Ans}}$$

(7)

$$\underset{3}{\frac{\cancel{7}}{\cancel{9}}} \text{ of } \overset{8}{\underset{7}{\frac{\cancel{24}}{\cancel{21}}}} \text{ of } \frac{1}{\cancel{3}} \text{ of } \overset{\overset{2}{\cancel{6}}}{\frac{\cancel{18}}{\cancel{7}}} = \frac{16}{21}, \textit{ Ans.}$$

(8)

$$\underset{7}{\frac{\cancel{10}}{\cancel{21}}} \text{ of } \overset{\overset{\overset{3}{\cancel{6}}}{\cancel{12}}}{\underset{\underset{5}{\cancel{10}}}{\frac{\cancel{36}}{\cancel{100}}}} \text{ of } \underset{\cancel{2}}{\frac{\cancel{14}}{\cancel{28}}} \text{ of } \frac{3}{25} = \frac{9}{875}, \textit{ Ans.}$$

(1)

$\frac{3}{5}, \frac{2}{3}, \frac{1}{7} = \frac{63}{105}, \frac{70}{105}, \frac{15}{105}$, *Ans.*

$3 \times 3 \times 7 = 63$ numerator.
$2 \times 5 \times 7 = 70$ "
$1 \times 3 \times 5 = 15$ "
$5 \times 3 \times 7 = 105$ com. denom.

(2)

$\frac{2}{9}, \frac{4}{11}, \frac{3}{5} = \frac{110}{495}, \frac{180}{495}, \frac{297}{495}$, *Ans.*

$2 \times 11 \times 5 = 110$ numerator.
$4 \times 9 \times 5 = 180$ "
$3 \times 9 \times 11 = 297$ "
$9 \times 11 \times 5 = 495$ com. denom.

(3)

$\frac{5}{7}, \frac{1}{8}, \frac{5}{9} = \frac{360}{504}, \frac{63}{504}, \frac{280}{504}$, *Ans.*

$5 \times 8 \times 9 = 360$ numerator.
$1 \times 7 \times 9 = 63$ "
$5 \times 7 \times 8 = 280$ "
$7 \times 8 \times 9 = 504$ com. denom.

(4)

$2\frac{1}{3} = \frac{7}{3}$, $\frac{1}{2}$ of $\frac{1}{7} = \frac{1}{14} = \frac{98}{42}, \frac{3}{42}$, *Ans.*

$7 \times 14 = 98$ numerator.
$1 \times 3 = 3$ "
$3 \times 14 = 42$ com. denom.

(5)

$5\frac{1}{2} = \frac{11}{2}$, $\frac{6}{7}$ of $\frac{1}{3} = \frac{6}{21}$, $\frac{4}{1} = \frac{231}{42}, \frac{12}{42}, \frac{168}{42}$, *Ans.*

$11 \times 21 \times 1 = 231$ numerator.
$6 \times 2 \times 1 = 12$ "
$4 \times 2 \times 21 = 168$ "
$2 \times 21 \times 1 = 42$ com. denom.

(6)

$3\frac{1}{6}$ of $\frac{1}{2} = \frac{19}{12}$, $\frac{3}{5} = \frac{95}{60}, \frac{36}{60}$, *Ans.*

$19 \times 5 = 95$ numerator.
$3 \times 12 = 36$ "
$12 \times 5 = 60$ com. denom.

(7)

$\frac{7}{8}, \frac{135}{75}, \frac{37}{1} = \frac{525}{600}, \frac{1080}{600}, \frac{22200}{600}$, *Ans.*

$7 \times 75 \times 1 = 525$ numerator.
$135 \times 8 \times 1 = 1080$ "
$37 \times 8 \times 75 = 22200$ "
$8 \times 75 \times 1 = 600$ com. denom.

(8)

$\frac{4}{1}, \frac{31}{25}, \frac{62}{3} = \frac{300}{75}, \frac{93}{75}, \frac{1550}{75}$, *Ans.*

$4 \times 25 \times 3 = 300$ numerator.
$31 \times 1 \times 3 = 93$ "
$62 \times 1 \times 25 = 1550$ "
$1 \times 25 \times 3 = 75$ com. denom.

(9)

$7\frac{1}{2} = \frac{15}{2}$, $\frac{31}{18}$, $6\frac{1}{4} = \frac{25}{4} = \frac{1080}{144}$, $\frac{248}{144}$, $\frac{900}{144}$, *Ans.*

$15 \times 18 \times 4 = 1080$ numerator.
$31 \times 2 \times 4 = 248$ "
$25 \times 2 \times 18 = 900$ "
$2 \times 18 \times 4 = 144$ com. denom.

(10)

$4\frac{1}{9} = \frac{37}{9}$, $8\frac{1}{7} = \frac{57}{7}$, $2\frac{1}{2} = \frac{5}{2} = \frac{518}{126}$, $\frac{1026}{126}$, $\frac{315}{126}$, *Ans*

$37 \times 7 \times 2 = 518$ numerator.
$57 \times 9 \times 2 = 1026$ "
$5 \times 9 \times 7 = 315$ "
$9 \times 7 \times 2 = 126$ com. denom.

(12)

$$\frac{1 \times 3}{5 \times 3} = \frac{3}{15}, \quad \frac{1 \times 5}{3 \times 5} = \frac{5}{15}.$$

(13)

$$\frac{1 \times 2}{6 \times 2} = \frac{2}{12}, \quad \frac{1}{12}, \quad \frac{3 \times 3}{4 \times 3} = \frac{9}{12}.$$

(14)

$$\frac{3 \times 4}{7 \times 4} = \frac{12}{28}, \quad \frac{8}{28}, \quad \frac{4 \times 2}{14 \times 2} = \frac{8}{28}.$$

(15)

$$\frac{5 \times 3}{8 \times 3} = \frac{15}{24}, \quad 3\frac{5}{6} = \frac{23 \times 4}{6 \times 4} = \frac{92}{24}, \quad \frac{3 \times 6}{4 \times 6} = \frac{18}{24}.$$

(16)

$$6\frac{5}{12} = \frac{77 \times 4}{12 \times 4} = \frac{308}{48}, \quad 9\frac{1}{2} = \frac{19 \times 24}{2 \times 24} = \frac{456}{48}, \quad \frac{5 \times 48}{1 \times 48} = \frac{240}{48}.$$

(17)

$$7\tfrac{5}{6}=\frac{47\times 6}{6\times 6}=\tfrac{282}{36},\quad \frac{4\times 4}{9\times 4}=\tfrac{16}{36},\quad \frac{1\times 9}{4\times 9}=\tfrac{9}{36},\quad \frac{1\times 4}{9\times 4}=\tfrac{4}{36}$$

(1)

$\frac{4}{5}, \frac{8}{9}, \frac{3}{15} = \frac{36}{45}, \frac{40}{45}, \frac{9}{45}$, *Ans.*

45 = least com. multiple, or least com. denom.

45 ÷ 5 = 9; 9 × 4 = 36 = 1st numerator.
45 ÷ 9 = 5; 5 × 8 = 40 = 2d "
45 ÷ 15 = 3; 3 × 3 = 9 = 3d "

(2)

$14\frac{5}{4} = \frac{61}{4}$, $6\frac{3}{8} = \frac{51}{8}$, $5\frac{1}{2} = \frac{11}{2} = \frac{122}{8}, \frac{51}{8}, \frac{44}{8}$, *Ans.*

8 = least com. denom.

8 ÷ 4 = 2; 2 × 61 = 122.
8 ÷ 8 = 1; 1 × 51 = 51.
8 ÷ 2 = 4; 4 × 11 = 44.

(3)

$\frac{3}{15}, \frac{4}{24}, \frac{8}{9} = \frac{72}{360}, \frac{60}{360}, \frac{320}{360}$, *Ans.*

360 = least com. denom.

360 ÷ 15 = 24; 24 × 3 = 72.
360 ÷ 24 = 15; 15 × 4 = 60.
360 ÷ 9 = 40; 40 × 8 = 320.

(4)

$\frac{67}{120}, \frac{6}{40}, \frac{5}{2} = \frac{67}{120}, \frac{18}{120}, \frac{300}{120}$, *Ans.*

120 = least com. denom.

120 ÷ 120 = 1; 1 × 67 = 67.
120 ÷ 40 = 3; 3 × 6 = 18.
120 ÷ 2 = 60; 60 × 5 = 300.

(5)

$\frac{41}{50}$, $\frac{66}{20}$, 4, equal $\frac{41}{50}$, $\frac{33}{10}$, $\frac{4}{1}$.

50 = least com. denom.

$50 \div 50 = 1;\ 1 \times 41 = 41.$

$50 \div 10 = 5;\ 5 \times 33 = 165.$

$50 \div 1 = 50;\ 5 \times 40 = 200.$

Ans. $\frac{41}{50}$, $\frac{165}{50}$, $\frac{200}{50}$.

(6)

$3\frac{1}{8} = \frac{25}{8}$, $4\frac{4}{12} = \frac{52}{12}$, $8\frac{6}{18} = \frac{150}{18} = \frac{225}{72}$, $\frac{312}{72}$, $\frac{600}{72}$, *Ans.*

72 = least com. denom.

$72 \div 8 = 9;\ 9 \times 25 = 225.$

$72 \div 12 = 6;\ 6 \times 52 = 312.$

$72 \div 18 = 4;\ 4 \times 150 = 600.$

(7)

$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6} = \frac{6}{12}$, $\frac{8}{12}$, $\frac{9}{12}$, $\frac{10}{12}$, *Ans.*

12 = least com. denom.

$12 \div 2 = 6;\ 6 \times 1 = 6.$

$12 \div 3 = 4;\ 4 \times 2 = 8.$

$12 \div 4 = 3;\ 3 \times 3 = 9.$

$12 \div 6 = 2;\ 2 \times 5 = 10.$

(8)

$2\frac{1}{2}$ of $\frac{1}{6} = \frac{5}{12}$, $3\frac{1}{7}$ of $2 = \frac{44}{7} = \frac{35}{84}$, $\frac{528}{84}$, *Ans.*

84 = least com. denom.

$84 \div 12 = 7;\ 7 \times 5 = 35.$

$84 \div 7 = 12;\ 12 \times 44 = 528.$

(9)

$\frac{2}{5}$, $\frac{4}{6}$, $\frac{5}{9}$, $\frac{7}{10} = \frac{36}{90}$, $\frac{60}{90}$, $\frac{50}{90}$, $\frac{63}{90}$, *Ans.*

90 = least com. denom.

$90 \div 5 = 18;\ 18 \times 2 = 36.$

$90 \div 6 = 15;\ 15 \times 4 = 60.$

$90 \div 9 = 10;\ 10 \times 5 = 50.$

$90 \div 10 = 9;\ 9 \times 7 = 63.$

(10)

$\frac{1}{3}, \frac{3}{4}, \frac{5}{6}, \frac{7}{8}, \frac{11}{16} = \frac{16}{48}, \frac{36}{48}, \frac{40}{48}, \frac{42}{48}, \frac{33}{48}$, *Ans.*

48 = least com. denom.

$48 \div 3 = 16;\ 16 \times 1 = 16.$
$48 \div 4 = 12;\ 12 \times 3 = 36.$
$48 \div 6 = 8;\ 8 \times 5 = 40.$
$48 \div 8 = 6;\ 6 \times 7 = 42.$
$48 \div 16 = 3;\ 3 \times 11 = 33.$

ADDITION OF FRACTIONS.

(5)

$$\begin{array}{l} 5\,\underline{)\,\frac{4}{5}+\frac{3}{10}+\frac{2}{15}} = \frac{24}{30}+\frac{9}{30}+\frac{4}{30} = \frac{37}{30} = 1\frac{7}{30}, \textit{ Ans.} \\ \quad\ 1\ .\ 2\ .\ 3 \end{array}$$

30 = least com. denom.

$$\begin{array}{r} 30 \div 5 = 6;\ 6 \times 4 = 24 \\ 30 \div 10 = 3;\ 3 \times 3 = 9 \\ 30 \div 15 = 2;\ 2 \times 2 = \underline{4} \\ 30\,\underline{)\,37} \\ 1\frac{7}{30} \end{array}$$

(6)

$\frac{1}{2}+\frac{3}{4}+\frac{2}{8}+\frac{3}{16}=\frac{8}{16}+\frac{12}{16}+\frac{4}{16}+\frac{3}{16}=\frac{27}{16}=1\frac{11}{16}$, *Ans.*

(7)

$\frac{2}{3}+\frac{3}{4}+\frac{5}{6}+\frac{7}{12}=\frac{8}{12}+\frac{9}{12}+\frac{10}{12}+\frac{7}{12}=\frac{34}{12}=2\frac{10}{12}=2\frac{5}{6}$, *Ans.*

(8)

$\frac{3}{4}+\frac{7}{8}+\frac{1}{5}+\frac{9}{10}=\frac{30}{40}+\frac{35}{40}+\frac{8}{40}+\frac{36}{40}=\frac{109}{40}=2\frac{29}{40}$, *Ans.*

(9)

$\frac{9}{1}+\frac{2}{3}+\frac{1}{15}+\frac{5}{6}+\frac{2}{9}=\frac{810}{90}+\frac{60}{90}+\frac{6}{90}+\frac{75}{90}+\frac{20}{90}=\frac{971}{90}=10\frac{71}{90}.$

(10)

$$\frac{1}{2}+\frac{9}{7}+\frac{1}{8}+\frac{4}{9}=\frac{252}{504}+\frac{648}{504}+\frac{63}{504}+\frac{224}{504}=\frac{1187}{504}=2\frac{179}{504},\ \textit{Ans.}$$

(11)

$$\frac{5}{12}+\frac{5}{8}+\frac{6}{10}+\frac{3}{5}=\frac{50}{120}+\frac{75}{120}+\frac{72}{120}+\frac{72}{120}=\frac{269}{120}=2\frac{29}{120},\ \textit{Ans.}$$

(12)

$$\frac{1}{7}+\frac{2}{9}+\frac{5}{6}=\frac{18}{126}+\frac{28}{126}+\frac{105}{126}=\frac{151}{126}=1\frac{25}{126},\ \textit{Ans.}$$

(13)

$$\frac{1}{16}+\frac{3}{7}+\frac{2}{8}+\frac{4}{9}=\frac{63}{1008}+\frac{432}{1008}+\frac{252}{1008}+\frac{448}{1008}=\frac{1195}{1008}=1\frac{187}{1008}.$$

(14)

$$\frac{6}{12}+\frac{3}{5}+\frac{4}{8}+\frac{6}{30}=\frac{60}{120}+\frac{72}{120}+\frac{60}{120}+\frac{24}{120}=\frac{216}{120}=1\frac{96}{120}=1\frac{4}{5}$$

(16)

$$3+7+12+1=23;\ \frac{1}{4}+\frac{9}{10}+\frac{4}{5}+\frac{7}{8}=\frac{10}{40}+\frac{36}{40}+\frac{32}{40}+\frac{35}{40}=2\frac{33}{40};$$

$$23+2\frac{33}{40}=25\frac{33}{40},\ \textit{Ans.}$$

(17)

$$16+9+25=50;\ \frac{3}{4}+\frac{7}{9}+\frac{11}{12}=2\frac{4}{9};\ 50+2\frac{4}{9}=52\frac{4}{9},\ \textit{Ans.}$$

(18)

$$\frac{2}{10}+\frac{36}{7}+\frac{9}{10}=6\frac{17}{70};\ 14+6\frac{17}{70}=20\frac{17}{70},\ \textit{Ans.}$$

(19)

$$2+6+12=20;\ \frac{8}{11}+\frac{1}{5}+\frac{19}{22}=1\frac{87}{110};\ 20+1\frac{87}{110}=21\frac{87}{110}.$$

(20)

$$900+450+75=1425;\ \frac{1}{10}+\frac{4}{5}+\frac{19}{25}=1\frac{33}{50};$$

$$1425+1\frac{33}{50}=1426\frac{33}{50},\ \textit{Ans.}$$

(21)

$$\frac{1}{12}+\frac{1}{9}=\frac{9}{108}+\frac{12}{108}=\frac{21}{108}=\frac{7}{36},\ \textit{Ans.}$$

(22)

$\frac{2}{3}+\frac{94}{15}=\frac{104}{15}=6\frac{14}{15};\ 17+6\frac{14}{15}=23\frac{14}{15}$, *Ans.*

(23)

$7+8=15;\ \frac{4}{5}+\frac{1}{2}+\frac{3}{4}=2\frac{1}{20};\ 15+2\frac{1}{20}=17\frac{1}{20}$, *Ans.*

(24)

$$\frac{3}{4}\text{ of }12\frac{2}{3}\text{ of }7\frac{4}{5}=\frac{3}{4}\text{ of }\frac{38}{\cancel{3}}\text{ of }\frac{\overset{13}{\cancel{39}}}{5}=\frac{1482}{20};\ \frac{8}{9}\text{ of }25=\frac{200}{9};$$

$$\frac{1482}{20}+\frac{200}{9}=\frac{13338}{180}+\frac{4000}{180}=\frac{17338}{180}=96\frac{29}{90},\ \textit{Ans.}$$

(25)

$$\frac{4}{25}\text{ of }\frac{48}{5}=\frac{192}{125};\ \frac{4}{21}\text{ of }\frac{1642}{5}=\frac{6568}{105};$$

$$\frac{192}{125}+\frac{6568}{105}=64\frac{232}{2625},\ \textit{Ans.}$$

SUBTRACTION.

(1)

$\frac{5}{7}-\frac{4}{9}=\frac{45}{63}-\frac{28}{63}=\frac{17}{63}$, *Ans.*

(2)

$\frac{6}{7}-\frac{5}{8}=\frac{48}{56}-\frac{35}{56}=\frac{13}{56}$, *Ans.*

(3)

$\frac{6}{13}-\frac{5}{17}=\frac{102}{221}-\frac{65}{221}=\frac{37}{221}$, *Ans.*

(4)

$1-\frac{67}{100}=\frac{100}{100}-\frac{67}{100}=\frac{33}{100}$, *Ans.*

(5)

$\frac{12}{8}-\frac{16}{34}=\frac{408}{272}-\frac{128}{272}=\frac{280}{272}=\frac{35}{34}=1\frac{1}{34}$, *Ans.*

(6)

$$\tfrac{3}{7} \text{ of } \tfrac{3}{2} \text{ of } \tfrac{7}{1} = \tfrac{9}{2};\quad \tfrac{5}{4} \text{ of } \tfrac{3}{8} = \tfrac{15}{32};$$

$$\tfrac{9}{2} - \tfrac{15}{32} = \tfrac{288}{64} - \tfrac{30}{64} = \tfrac{258}{64} = 4\tfrac{1}{32}, \textit{ Ans.}$$

(7)

$$\frac{\cancel{8}}{\underset{3}{\cancel{9}}} \text{ of } \frac{\cancel{3}}{\cancel{4}} \text{ of } \frac{1}{\cancel{2}} = \tfrac{1}{3};\quad \frac{\cancel{3}}{11} \text{ of } \frac{2}{\cancel{3}} \text{ of } \frac{1}{1} = \tfrac{2}{11};$$

$$\tfrac{1}{3} - \tfrac{2}{11} = \tfrac{11}{33} - \tfrac{6}{33} = \tfrac{5}{33}, \textit{ Ans.}$$

(8)

$$\frac{\cancel{5}}{\underset{2}{\cancel{8}}} \text{ of } \frac{\cancel{4}}{\cancel{5}} \text{ of } \frac{19}{3} = \tfrac{19}{6};\quad \frac{\cancel{3}}{\cancel{5}} \text{ of } \frac{\cancel{5}}{\underset{2}{\cancel{6}}} \text{ of } \frac{5}{7} = \tfrac{5}{14};$$

$$\tfrac{19}{6} - \tfrac{5}{14} = \tfrac{266}{84} - \tfrac{30}{84} = \tfrac{236}{84} = 2\tfrac{17}{21}, \textit{ Ans}$$

(9)

$$\frac{\overset{2}{\cancel{4}}}{\cancel{11}} \text{ of } \frac{\overset{2}{\cancel{22}}}{\underset{9}{\cancel{18}}} \text{ of } \frac{1}{3} = \tfrac{4}{27};\quad \frac{3}{\underset{4}{\cancel{12}}} \text{ of } \frac{\cancel{3}}{7} = \tfrac{3}{28};$$

$$\tfrac{4}{27} - \tfrac{3}{28} = \tfrac{112}{756} - \tfrac{81}{756} = \tfrac{31}{756}, \textit{ Ans.}$$

(11)

$$84\tfrac{7}{15} - 16\tfrac{1}{3} = \tfrac{1267}{15} - \tfrac{49}{3} = \tfrac{3801}{45} - \tfrac{735}{45} = \tfrac{3066}{45} = 68\tfrac{2}{15}.$$

(12)

$$246\tfrac{3}{8} - 164\tfrac{1}{5} = \tfrac{1971}{8} - \tfrac{821}{5} = \tfrac{9855}{40} - \tfrac{6568}{40} = \tfrac{3287}{40} = 82\tfrac{7}{40}$$

(14)

$$\begin{array}{rcr} 16\tfrac{5}{8} & = & 16\tfrac{45}{72} \\ 5\tfrac{8}{9} & = & 5\tfrac{64}{72} \\ \hline & & 10\tfrac{53}{72}, \textit{ Ans.} \end{array}$$

(15)

$$\begin{array}{rcr} 26\tfrac{3}{7} & = & 26\tfrac{27}{63} \\ 19\tfrac{7}{9} & = & 19\tfrac{49}{63} \\ \hline & & 6\tfrac{41}{63}, \textit{ Ans.} \end{array}$$

(16)

$$\begin{array}{rl} 36\tfrac{3}{5} &= 36\tfrac{33}{55} \\ 27\tfrac{8}{11} &= \underline{27\tfrac{40}{55}} \\ & \quad 8\tfrac{48}{55}, \textit{ Ans.} \end{array}$$

(17)

$$\begin{array}{rl} 400\tfrac{5}{12} &= 400\tfrac{10}{24} \\ 327\tfrac{5}{8} &= \underline{327\tfrac{15}{24}} \\ & \quad 72\tfrac{19}{24}, \textit{ Ans.} \end{array}$$

MULTIPLICATION.

(1)

$\frac{37}{144} \times 12 = \frac{444}{144} = 3\frac{1}{12}$, or $\frac{37}{144} \times 12 = \frac{37}{12} = 3\frac{1}{12}$, *Ans.*

(2)

$\frac{47}{49} \times 7 = \frac{329}{49} = 6\frac{5}{7}$, or $\frac{47}{49} \times 7 = \frac{47}{7} = 6\frac{5}{7}$, *Ans.*

(3)

$\frac{175}{45} \times 9 = \frac{1575}{45}$ or $\frac{175}{5} = 35$, *Ans.*

(4)

$\frac{127}{15} \times 5 = \frac{635}{15}$ or $\frac{127}{3} = 42\frac{1}{3}$, *Ans.*

(5)

$\frac{369}{147} \times 49 = \frac{18081}{147}$ or $\frac{369}{3} = 123$, *Ans.*

(6)

$\frac{175}{273} \times 26 = \frac{4550}{273} = 16\frac{2}{3}$, *Ans.*

(7)

$\frac{5}{9} \times 15 = \frac{75}{9} = 8\frac{1}{3}$ cords, *Ans.*

(8)

$\frac{5}{6} \times 12 = \frac{60}{6} = \$10.$

(9)

$\frac{3}{4} \times 18 = \frac{54}{4} = 13\frac{1}{2}$ bush.

(10)

$\frac{3}{22} \times 64 = \frac{192}{22} = \$8\frac{8}{11}.$

(11)

$\frac{13}{5} \times 8 = \frac{104}{5} = 20\frac{4}{5}$ cents.

(12)

$\frac{39}{10} \times 15 = \frac{585}{10} = \$58\frac{1}{2}$.

(13)

$\frac{39}{7} \times 9 = \frac{351}{7} = 50\frac{1}{7}$ bbls.

(1)

$24 \times \frac{7}{8} = 21$, or $24 \times \frac{7}{8} = \frac{168}{8} = 21$, or $\frac{\overset{3}{\cancel{24}}}{1} \times \frac{7}{\cancel{8}} = 21$

(2)

$\frac{\overset{7}{\cancel{42}}}{1} \times \frac{11}{\underset{2}{\cancel{12}}} = \frac{77}{2} = 38\frac{1}{2}$, *Ans.*

(3)

$\frac{\overset{15}{\cancel{105}}}{1} \times \frac{5}{\cancel{7}} = 75$, *Ans.*

(4)

$\frac{\overset{16}{\cancel{64}}}{1} \times \frac{15}{\underset{9}{\cancel{36}}} = \frac{240}{9} = 26\frac{2}{3}$, *Ans.*

(5)

$8 \times \frac{2}{3} = \frac{16}{3} = \$5\frac{1}{3}$, *Ans.*

(6)

$\frac{\overset{25}{\cancel{75}}}{1} \times \frac{7}{\underset{4}{\cancel{12}}} = \frac{175}{4} = \$43\frac{3}{4}$, *Ans.*

(7)

$\frac{\overset{20}{\cancel{320}}}{1} \times \frac{9}{\underset{1}{\cancel{16}}} = \$180$, *Ans*

(8)

$46 \times \frac{4}{5} = \frac{184}{5} = 36\frac{4}{5}$ miles.

(9)

$\frac{\overset{9}{\cancel{18}}}{1} \times \frac{9}{\underset{5}{\cancel{10}}} = \frac{81}{5} = \$16\frac{1}{5}$.

(10)

$\frac{\overset{40}{\cancel{480}}}{1} \times \frac{11}{\cancel{12}} = \frac{440}{1} = \$440$, *Ans.*

(1)

$\frac{7}{\underset{2}{\cancel{8}}} \times \frac{\cancel{4}}{5} = \frac{7}{10}$, *Ans.*

(2)

$\frac{\cancel{9}}{13} \times \frac{\overset{5}{\cancel{15}}}{\underset{3}{\cancel{27}}} = \frac{5}{13}$, *Ans.*

(3)

$$\frac{\cancel{3}}{4} \times \frac{\cancel{5}}{8} \times \frac{7}{\cancel{15}} = \frac{7}{32},\ \textit{Ans.}$$

(4)

$$\frac{\overset{3}{\cancel{6}}}{\cancel{7}} \times \frac{\cancel{9}}{\underset{7}{\cancel{14}}} \times \frac{\overset{\cancel{3}}{\cancel{21}}}{\underset{\cancel{3}}{\cancel{27}}} = \frac{3}{7},\ \textit{Ans.}$$

(5)

$$\frac{\overset{3}{\cancel{9}}}{\underset{2}{\cancel{10}}} \times \frac{\cancel{5}}{\underset{2}{\cancel{6}}} = \$\frac{3}{4},\ \textit{Ans.}$$

(6)

$$\frac{\overset{2}{\cancel{6}}}{7} \times \frac{2}{\cancel{3}} = \frac{4}{7} \text{ of farm},\ \textit{Ans.}$$

(7)

$$\frac{\cancel{4}}{5} \times \frac{7}{\underset{4}{\cancel{16}}} = \$\frac{7}{20},\ \textit{Ans}$$

(8)

$$\frac{5}{\underset{4}{\cancel{8}}} \times \frac{\overset{3}{\cancel{6}}}{7} = \$\frac{15}{28},\ \textit{Ans.}$$

GENERAL EXAMPLES.

(1)

$$\frac{1}{2} \text{ of } \frac{7}{\underset{2}{\cancel{8}}} \text{ of } \frac{\cancel{4}}{5} \times \frac{9}{14} = \frac{\cancel{7}}{20} \times \frac{9}{\underset{2}{\cancel{14}}} = \frac{9}{40},\ \textit{Ans.}$$

(2)

$$\frac{9}{10} \times \frac{\overset{1}{\cancel{2}}}{\cancel{5}} \text{ of } \frac{\cancel{5}}{\underset{2}{\cancel{4}}} = \frac{9}{10} \times \frac{1}{2} = \frac{9}{20},\ \textit{Ans}$$

(3)

$$\frac{1}{8} \text{ of } 3 \times \frac{1}{\underset{3}{\cancel{6}}} \text{ of } \frac{\overset{68}{\cancel{136}}}{9} = \frac{\cancel{3}}{\underset{2}{\cancel{8}}} \times \frac{\overset{17}{\cancel{68}}}{\underset{9}{\cancel{27}}} = \frac{17}{18},\ \textit{Ans.}$$

(4)

$$\frac{\cancel{5}}{1} \text{ of } \frac{2}{\cancel{3}} \text{ of } \frac{\cancel{3}}{\cancel{5}} \times \frac{25}{6} = \frac{\cancel{2}}{1} \times \frac{25}{\underset{3}{\cancel{6}}} = \frac{25}{3} = 8\tfrac{1}{3},\ \textit{Ans.}$$

(5)

$$\frac{\overset{\cancel{2}}{\cancel{14}}}{1} \text{ of } \frac{5}{\underset{2}{\cancel{6}}} \text{ of } \frac{9}{1} \times \frac{\overset{15}{\cancel{45}}}{\cancel{7}} = 675, \textit{ Ans.}$$

(6)

$$\frac{8}{7} \text{ of } \frac{6}{1} \text{ of } \frac{\cancel{5}}{\cancel{4}} \times \frac{\overset{2}{\cancel{8}}}{\cancel{5}} \text{ of } \frac{4}{1} = \frac{144}{7} = 20\tfrac{4}{7}, \textit{ Ans.}$$

(8)

$$67 \times 9\tfrac{1}{2} = 67 \times 9 + 67 \times \tfrac{1}{2} = 603 + 33\tfrac{1}{2} = 636\tfrac{1}{2}, \textit{ Ans.}$$

(9)

$$9 \times 12\tfrac{2}{3} = 9 \times 12 + 9 \times \tfrac{2}{3} = 108 + 6 = 114, \textit{ Ans.}$$

(10)

$$108 \times 12\tfrac{4}{9} = 108 \times 12 + 108 \times \tfrac{4}{9} = 1344, \textit{ Ans.}$$

(11)

$$5\tfrac{6}{7} \times 3\tfrac{1}{2} = \tfrac{41}{7} \times \tfrac{7}{2} = \tfrac{287}{14} = 20\tfrac{1}{2}, \textit{ Ans.}$$

(12)

$$6\tfrac{1}{5} \times 2\tfrac{7}{9} \times \tfrac{1}{4} \text{ of } 12 = \frac{31}{\cancel{5}} \times \frac{\overset{5}{\cancel{25}}}{\underset{3}{\cancel{9}}} \times \frac{\cancel{3}}{1} = \tfrac{155}{3} = 51\tfrac{2}{3}, \textit{ Ans.}$$

(13)

$$3\tfrac{3}{4} \times 24 = \frac{15}{\cancel{4}} \times \frac{\overset{6}{\cancel{24}}}{1} = \$90, \textit{ Ans.}$$

(14)

$$3\tfrac{3}{4} \times 6\tfrac{2}{3} = \frac{\overset{5}{\cancel{15}}}{\cancel{4}} \times \frac{\overset{5}{\cancel{20}}}{\cancel{3}} = \$25, \textit{ Ans.}$$

(15)

$$\frac{\cancel{3}}{\underset{2}{\cancel{14}}} \text{ of } \frac{\cancel{7}}{\cancel{9}} \text{ of } \frac{\overset{2}{\overset{\cancel{4}}{\cancel{12}}}}{1} = 2 \text{ tons, } \textit{Ans.}$$

(16)

$$\frac{\cancel{2}}{\cancel{3}} \text{ of } \frac{\cancel{5}}{\underset{4}{\cancel{8}}} \times \frac{7}{\underset{2}{\cancel{10}}} \text{ of } \frac{\cancel{6}}{11} = \$\tfrac{7}{44}, \textit{ Ans.}$$

(17)

$$96\tfrac{1}{2} \times 5\tfrac{2}{3} = \frac{193}{2} \times \frac{17}{3} = \tfrac{3281}{6} = 546\tfrac{5}{6} \text{ cents, } \textit{Ans.}$$

(18)

$$\tfrac{3}{16} \times 7\tfrac{11}{12} = \frac{\cancel{3}}{16} \times \frac{95}{\underset{4}{\cancel{12}}} = \tfrac{95}{64} = \$1\tfrac{31}{64}, \textit{ Ans.}$$

(19)

$$7\tfrac{2}{5} \times \tfrac{175}{1} = \frac{37}{\cancel{5}} \times \frac{\overset{35}{\cancel{175}}}{1} = \$1295, \textit{ Ans.}$$

(20)

$$\frac{\cancel{7}}{\cancel{8}} \text{ of } \frac{\overset{5}{\cancel{40}}}{\cancel{3}} \times \frac{\cancel{3}}{\underset{3}{\cancel{9}}} \text{ of } \frac{\overset{2}{\cancel{6}}}{\cancel{7}} \text{ of } \frac{2}{1} = \tfrac{20}{3} = \$6\tfrac{2}{3}, \textit{ Ans.}$$

(21)

$$3\tfrac{6}{7} \times 15\tfrac{2}{3} = \frac{\overset{9}{\cancel{27}}}{7} \times \frac{47}{\cancel{3}} = \tfrac{423}{7} = \$60\tfrac{3}{7}, \textit{ Ans.}$$

DIVISION.

(1)

$\frac{15}{11} \div 6 = \frac{15}{66} = \frac{5}{22}$, *Ans.*

(2)

$\frac{18}{37} \div 9 = \frac{2}{37}$, *Ans.*

(3)

$\frac{405}{19} \div 15 = \frac{27}{19} = 1\frac{8}{19}$.

(4)

$\frac{450}{531} \div 75 = \frac{6}{531} = \frac{2}{177}$.

(5)

$\frac{18}{19} \div 6 = \frac{3}{19}$.

(6)

$\frac{42}{91} \div 12 = \frac{42}{1092} = \frac{1}{26}$.

(7)

$\frac{15}{33} \div 20 = \frac{15}{660} = \frac{1}{44}$.

(8)

$\frac{126}{651} \div 27 = \frac{126}{17577} = \frac{2}{279}$.

(9)

$\frac{9}{10} \div 6 = \frac{9}{60} = \frac{3}{20}$ ton.

(10)

$\frac{6}{7} \div 9 = \frac{6}{63} = \$\frac{2}{21}$.

(11)

$\frac{8}{9} \div 4 = \frac{2}{9}$ yd.

(12)

$\frac{15}{16} \div 5 = \frac{3}{16}$ lb.

(13)

$\frac{3}{5} \div 6 = \frac{3}{30} = \frac{1}{10}$ bbl.

(14)

$3\frac{1}{3} \div 10 = \frac{10}{3} \div 10 = \$\frac{1}{3}$

(15)

$4\frac{2}{3} \div 21 = \frac{14}{3} \div 21 = \frac{14}{63} = \$\frac{2}{9}$.

(16)

$6\frac{2}{5} \div 12 = \frac{32}{60} = \frac{8}{15}$ lb

(1)

$$14 \div \frac{7}{8} = \frac{\overset{2}{\cancel{14}}}{1} \times \frac{8}{\cancel{7}} = 16, \text{ Ans.}$$

(2)

$$212 \div \frac{15}{16} = \frac{212}{1} \times \frac{16}{15} = \frac{3392}{15} = 226\frac{2}{15}, \text{ Ans.}$$

(3)

$$63 \div \tfrac{18}{27} = \frac{\overset{7}{\cancel{63}}}{1} \times \frac{27}{\underset{2}{\cancel{18}}} = 94\tfrac{1}{2},\ \textit{Ans.}$$

(4)

$$420 \div \tfrac{9}{11} = \frac{\overset{140}{\cancel{420}}}{1} \times \frac{11}{\underset{3}{\cancel{9}}} = \tfrac{1540}{3} = 513\tfrac{1}{3},\ \textit{Ans.}$$

(5)

$$9 \div \tfrac{11}{12} = \tfrac{9}{1} \times \tfrac{12}{11} = \tfrac{108}{11} = 9\tfrac{9}{11} \text{ yds.},\ \textit{Ans.}$$

(6)

$$10 \div \tfrac{7}{8} = \tfrac{10}{1} \times \tfrac{8}{7} = \tfrac{80}{7} = 11\tfrac{3}{7} \text{ hrs.},\ \textit{Ans.}$$

(7)

$$9 \div \tfrac{5}{8} = \tfrac{9}{1} \times \tfrac{8}{5} = \tfrac{72}{5} = 14\tfrac{2}{5} \text{ tons},\ \textit{Ans.}$$

(1)

$$\tfrac{9}{10} \div \tfrac{15}{16} = \frac{\overset{3}{\cancel{9}}}{\underset{5}{\cancel{10}}} \times \frac{\overset{8}{\cancel{16}}}{\underset{5}{\cancel{15}}} = \tfrac{24}{25},\ \textit{Ans.}$$

(2)

$$\tfrac{4}{11} \div \tfrac{12}{13} = \frac{\cancel{4}}{11} \times \frac{13}{\underset{3}{\cancel{12}}} = \tfrac{13}{33},\ \textit{Ans.}$$

(3)

$$3\tfrac{7}{9} \div \tfrac{17}{21} = \frac{\overset{2}{\cancel{34}}}{\underset{3}{\cancel{9}}} \times \frac{\overset{7}{\cancel{21}}}{\cancel{17}} = 4\tfrac{2}{3},\ \textit{Ans.}$$

(4)

$$\frac{\cancel{3}}{4} \text{ of } \frac{7}{\underset{3}{\cancel{9}}} \div \frac{7}{\underset{4}{\cancel{12}}} \text{ of } \frac{\cancel{3}}{2} = \frac{\cancel{7}}{\underset{3}{\cancel{12}}} \times \frac{\overset{2}{\cancel{8}}}{\cancel{7}} = \frac{2}{3}, \textit{ Ans.}$$

(5)

$$\frac{8}{\underset{3}{\cancel{9}}} \text{ of } \overset{7}{\cancel{21}} \div \frac{4}{5} \text{ of } \frac{11}{3} = \frac{\overset{14}{\cancel{56}}}{\cancel{3}} \times \frac{\overset{5}{\cancel{15}}}{\underset{11}{\cancel{44}}} = 6\tfrac{4}{11}, \textit{ Ans.}$$

(6)

$$6\tfrac{1}{8} \div 2\tfrac{1}{3} = \frac{\overset{7}{\cancel{49}}}{8} \times \frac{3}{\cancel{7}} = \frac{21}{8} = 2\tfrac{5}{8}, \textit{ Ans.}$$

(7)

$$\tfrac{11}{16} \div \tfrac{1}{8} = \frac{11}{\underset{2}{\cancel{16}}} \times \frac{\cancel{8}}{1} = 5\tfrac{1}{2} \text{ lbs., } \textit{Ans.}$$

(8)

$$8\tfrac{2}{5} \div 1\tfrac{1}{5} = \frac{\overset{7}{\cancel{42}}}{\cancel{5}} \times \frac{\cancel{5}}{\underset{1}{\cancel{6}}} = 7 \text{ men, } \textit{Ans}$$

(9)

$$4\tfrac{1}{2} \div 6 = \tfrac{9}{12} = \$\tfrac{3}{4}, \textit{ Ans.}$$

(10)

$$11\tfrac{1}{5} \div \tfrac{4}{5} = \frac{\overset{14}{\cancel{56}}}{\cancel{5}} \times \frac{\cancel{5}}{\underset{1}{\cancel{4}}} = 14 \text{ baskets, } \textit{Ans.}$$

(11)

$$6\tfrac{2}{3} \div \tfrac{5}{8} = \frac{\overset{4}{\cancel{20}}}{3} \times \frac{8}{\cancel{5}} = \$10\tfrac{2}{3},\ \textit{Ans.}$$

(12)

$$\tfrac{19}{24} \div \tfrac{1}{9} = \frac{19}{\underset{8}{\cancel{24}}} \times \frac{\overset{3}{\cancel{9}}}{1} = 7\tfrac{1}{8} \text{ lbs.},\ \textit{Ans.}$$

(13)

$$2\tfrac{4}{5} \div \tfrac{7}{10} = \frac{\overset{2}{\cancel{14}}}{\cancel{5}} \times \frac{\overset{2}{\cancel{10}}}{\underset{1}{\cancel{7}}} = 4 \text{ children},\ \textit{Ans.}$$

(14)

$$\tfrac{11}{12} \div \tfrac{1}{5} \text{ of } \tfrac{4}{5} = \tfrac{11}{12} \times \tfrac{25}{4} = 5\tfrac{35}{48} \text{ times},\ \textit{Ans.}$$

(15)

$$\frac{7}{\cancel{8}} \text{ of } \frac{1}{\cancel{2}} \text{ of } \frac{\overset{8}{\cancel{128}}}{3} \div \frac{1}{\cancel{6}} \text{ of } \frac{\overset{2}{\cancel{4}}}{\cancel{9}} \text{ of } \frac{\overset{\overset{1}{\cancel{3}}}{\cancel{27}}}{1} = \frac{\overset{28}{\cancel{56}}}{3} \times \frac{1}{\cancel{2}} = 9\tfrac{1}{3},\ \textit{Ans}$$

(16)

$$2\tfrac{3}{5} \div 5\tfrac{1}{5} = \frac{\cancel{13}}{\cancel{5}} \times \frac{\overset{1}{\cancel{5}}}{\underset{2}{\cancel{26}}} = \$\tfrac{1}{2},\ \textit{Ans.}$$

(17)

$$21 \div \tfrac{7}{9} = \frac{\overset{3}{\cancel{21}}}{1} \times \frac{9}{\cancel{7}} = 27 \text{ miles},\ \textit{Ans.}$$

(18)

$$12\frac{5}{6} \div 1\frac{3}{8} = \frac{\overset{7}{\cancel{77}}}{\underset{3}{\cancel{6}}} \times \frac{\overset{4}{\cancel{8}}}{\cancel{11}} = 9\frac{1}{3} \text{ turkeys, } \textit{Ans.}$$

(19)

$$\frac{21}{25} \div \frac{4}{5} \text{ of } \frac{1}{3} = \frac{21}{\underset{5}{\cancel{25}}} \times \frac{\overset{3}{\cancel{15}}}{4} = 3\frac{3}{20} \text{ yds., } \textit{Ans}$$

COMPLEX FRACTIONS.

(1)

$$\frac{\frac{4}{5}}{\frac{6}{7}} = \frac{4}{5} \div \frac{6}{7} = \frac{\overset{2}{\cancel{4}}}{5} \times \frac{7}{\underset{3}{\cancel{6}}} = \frac{14}{15}, \textit{ Ans.}$$

(2)

$$\frac{6\frac{2}{3}}{\frac{2}{3}} = \frac{20}{3} \div \frac{2}{3} = 10, \textit{ Ans}$$

(3)

$$\frac{7\frac{11}{12}}{3\frac{5}{6}} = \frac{95}{12} \div \frac{23}{6} = \frac{95}{\underset{2}{\cancel{12}}} \times \frac{\cancel{6}}{23} = 2\frac{3}{46}, \textit{ Ans.}$$

(4)

$$\frac{3}{4} \text{ of } \frac{\frac{1}{2}}{\frac{3}{7}} = \frac{3}{4} \text{ of } \left(\frac{1}{2} \times \frac{7}{3}\right) = \frac{21}{24} = \frac{7}{8}, \textit{ Ans.}$$

(5)

$$\frac{\frac{2}{\cancel{9}} \text{ of } \frac{\cancel{3}}{5}}{\frac{1}{4} \text{ of } 2\frac{4}{9}} = \frac{2}{15} \div \frac{11}{18} = \frac{2}{\underset{5}{\cancel{15}}} \times \frac{\overset{6}{\cancel{18}}}{11} = \frac{12}{55}, \textit{ Ans.}$$

(6)

$$\frac{25}{8\frac{3}{7}} = \frac{25}{1} \div \frac{59}{7} = \frac{25}{1} \times \frac{7}{59} = \frac{175}{59} = 2\tfrac{57}{59},\ \textit{Ans.}$$

(7)

$$\frac{14\frac{9}{10}}{\underset{3}{\frac{7}{\cancel{9}}} \text{ of } \overset{5}{\cancel{15}}} = \frac{149}{10} \div \frac{35}{3} = \frac{149}{10} \times \frac{3}{35} = 1\tfrac{97}{350},\ \textit{Ans.}$$

(8)

$$\frac{214\frac{3}{4}}{25\frac{11}{12}} = \frac{859}{4} \div \frac{311}{12} = \frac{859}{\cancel{4}} \times \frac{\overset{3}{\cancel{12}}}{311} = 8\tfrac{89}{311},\ \textit{Ans.}$$

(9)

$$\frac{\frac{21}{25}}{4\frac{9}{10}} = \frac{21}{25} \div \frac{49}{10} = \frac{\overset{3}{\cancel{21}}}{\underset{5}{\cancel{25}}} \times \frac{\overset{2}{\cancel{10}}}{\underset{7}{\cancel{49}}} = \frac{6}{35},\ \textit{Ans.}$$

(10)

$$\frac{\frac{4}{7} \text{ of } \frac{2}{3} \text{ of } 5\frac{1}{4}}{\frac{15}{16} \text{ of } 48} = \frac{2}{1} \div \frac{45}{1} = \frac{2}{1} \times \frac{1}{45} = \frac{2}{45},\ \textit{Ans.}$$

MISCELLANEOUS EXAMPLES.

(1)

$3\frac{4}{5} + 4\frac{5}{8} = 3\frac{32}{40} + 4\frac{25}{40} = \$8\frac{17}{40}$ = cost of boots and hat.

$9\frac{6}{7} - 8\frac{17}{40} = 9\frac{240}{280} - 8\frac{119}{280} = \$1\frac{121}{280}$ = what was left, *Ans.*

(2)

$$1\tfrac{7}{8} - \tfrac{4}{5} = \tfrac{75}{40} - \tfrac{32}{40} = \tfrac{43}{40} = 1\tfrac{3}{40},\ \textit{Ans.}$$

(3)

$$1\tfrac{5}{6} + \tfrac{5}{8} = \tfrac{88}{48} + \tfrac{30}{48} = \tfrac{118}{48} = 2\tfrac{11}{24},\ \textit{Ans.}$$

(4)

$\frac{3}{5} \times 10 = \$6.$

(5)

$12\frac{7}{16} - 7\frac{4}{7} = 12\frac{49}{112} - 7\frac{64}{112} = 4\frac{97}{112}.$

(6)

$24\frac{7}{8} + 15\frac{2}{5} = 24\frac{35}{40} + 15\frac{16}{40} = 40\frac{11}{40}$, Daniel's above James's.

$40\frac{11}{40} + 24\frac{7}{8} = 65\frac{3}{20}$, Daniel and Joseph's above James's.

$475\frac{9}{10} - 65\frac{3}{20} = 410\frac{3}{4}$ acres, to be divided by 3.

$410\frac{3}{4} \div 3 = 136\frac{11}{12}$ acres, James's farm.

$136\frac{11}{12} + 24\frac{7}{8} = 161\frac{19}{24}$ acres, Joseph's farm.

$161\frac{19}{24} + 15\frac{2}{5} = 177\frac{23}{120}$ acres, Daniel's farm.

(7)

$3\frac{4}{5} \times 6 = \$22\frac{4}{5}$; $20 + 5 = 25$; $25 - 22\frac{4}{5} = 2\frac{1}{5}$ change, *Ans.*

(8)

$6\frac{1}{2} + 4\frac{2}{5} + 5\frac{5}{8} = 16\frac{21}{40}$ = cost;

$$16\frac{21}{40} \div 1\frac{3}{4} = \frac{661}{\underset{10}{\cancel{40}}} \times \frac{\cancel{4}}{7} = 9\frac{31}{70} \text{ days, } \textit{Ans.}$$

(9)

$$2\frac{2}{5} \times 31\frac{1}{4} = \frac{\overset{3}{\cancel{12}}}{\cancel{5}} \times \frac{\overset{25}{\cancel{125}}}{\cancel{4}} = \$75, \text{ cost of cloth;}$$

$75 \div 12 = \$6\frac{1}{4}$ cost per bbl.

(10)

$$\frac{\overset{1}{\cancel{2}}}{\cancel{7}} \text{ of } \frac{\cancel{7}}{\underset{4}{\cancel{8}}} = \frac{1}{4};\ 4\frac{5}{6} \div \frac{1}{4} = \frac{29}{\underset{3}{\cancel{6}}} \times \frac{\overset{2}{\cancel{4}}}{1} = \frac{58}{3} = \$19\frac{1}{3}, \text{ cost of bbl.}$$

(11)

$$\frac{6}{7} \text{ of } 2\frac{1}{5} \times \frac{\cancel{2}}{5} \text{ of } \frac{3}{\underset{2}{\cancel{4}}} \text{ of } 9 = \frac{\overset{33}{\cancel{66}}}{35} \times \frac{27}{\underset{5}{\cancel{10}}} = \frac{891}{175};$$

$7\frac{1}{9} \div \frac{7}{8}$ of $\frac{13}{2} = \frac{64}{9} \times \frac{16}{91} = \frac{1024}{819}$;

$$\frac{891}{175} - \frac{1024}{819} = \frac{729729-179200}{143325} = \frac{550529}{143325} = 3\frac{120554}{143325}, \textit{ Ans}$$

(12)

$6\frac{3}{5} \div 2 = \$3\frac{3}{10}$, cost of apples per bbl.;

$3\frac{1}{10} \div 1\frac{3}{4} = \$\frac{62}{35}$, cost of potatoes per bbl.;

$\frac{5}{8} \div 3 = \$\frac{5}{24}$, cost of butter per lb.;

$\frac{62}{35} \div \frac{5}{24} = 8\frac{88}{175}$ lbs. of butter, *Ans.*

(13)

$2\frac{1}{2} \times \frac{7}{9} = \frac{35}{18}$; $\frac{6}{7} \div \frac{35}{18} = \frac{6}{7} \times \frac{18}{35} = \frac{108}{245}$ = 3d number, *Ans.*

(14)

$1\frac{3}{5} + \frac{9}{16} = \frac{128+45}{80} = \$\frac{173}{80}$;

$$54\frac{7}{8} \div \frac{173}{80} = \frac{439}{\cancel{8}} \times \frac{\overset{10}{\cancel{80}}}{173} = 25\frac{65}{173} \text{ days, } \textit{Ans.}$$

(15)

$250 \div \frac{2}{9} = 1125$ men, *Ans.*

(16)

$$\frac{1}{\underset{2}{\cancel{8}}} \text{ of } \frac{\cancel{4}}{15} = \frac{1}{30};\ 1640 \div \frac{1}{30} = \$49200, \textit{ Ans.}$$

(17)

$2\frac{1}{8} \times 81 = 172\frac{1}{8}$ cents; $\frac{6}{25} \div 12 = \$\frac{1}{50} = 2$ cents;

$172\frac{1}{8} \div 2 = 86\frac{1}{16}$ lemons, *Ans.*

(18)

The product, $\frac{5}{9}$, is as many times too great or small as $\frac{5}{6}$ is contained times in $\frac{5}{16}$:

$\frac{5}{16} \div \frac{5}{6} = \frac{3}{8}$: therefore, $\frac{5}{9} \times \frac{3}{8} = \frac{5}{24}$ = true product, *Ans*

(19)

$$\frac{\frac{7}{9} \text{ of } 2\frac{1}{7}}{2\frac{1}{9}} \times \frac{\frac{2}{3}}{\frac{1}{2} \text{ of } \frac{1}{6}} = \frac{\frac{5}{3} \times \frac{2}{3}}{\frac{19}{9} \times \frac{1}{12}} = \frac{\frac{10}{9}}{\frac{19}{108}} = \frac{10}{\cancel{9}} \times \frac{\overset{12}{\cancel{108}}}{19} = 6\frac{6}{19}.$$

(20)

$\frac{7}{9} \div \frac{3}{5} = \$\frac{35}{27}$, cost of 1 yard;

$\frac{35}{27} \times 2\frac{5}{6} = \frac{35}{27} \times \frac{17}{6} = \frac{595}{162} = 3\frac{109}{162}$, *Ans.*

(21)

$23\frac{1}{4} \div 18 = \$\frac{93}{72}$, 1 man's wages;

$$\frac{93}{\underset{8}{\cancel{72}}} \times 33 \times \frac{\overset{7}{\cancel{63}}}{4} = \frac{21483}{32} = \$671\frac{11}{32}, \textit{ Ans.}$$

(22)

A. will mow $\frac{1}{3}$ acre per day, and B. $\frac{1}{2}$ acre per day;

$\frac{1}{3} + \frac{1}{2} = \frac{5}{6}$ acres that both mow in one day;

$1 \div \frac{5}{6} = \frac{6}{5} = 1\frac{1}{5}$ days, *Ans.*

(23)

A. and B. do $\frac{1}{10}$ of the work in one day;

A. does $\frac{1}{16}$ of the work in one day;

$\frac{1}{10} - \frac{1}{16} = \frac{3}{80}$ work that B. does in one day;

$1 \div \frac{3}{80} = \frac{80}{3} = 26\frac{2}{3}$ days for B. to do the work.

(24)

$$\frac{5\frac{1}{3}}{18\frac{2}{5}} \times \frac{11\frac{11}{12}}{12\frac{1}{10}} = \frac{\frac{\overset{4}{\cancel{16}}}{3} \times \frac{143}{\cancel{12}_3}}{\frac{\cancel{92}^{46}}{5} \times \frac{121}{\underset{5}{\cancel{10}}}} = \frac{\frac{572}{9}}{\frac{5566}{25}} = \frac{\overset{\overset{26}{\cancel{286}}}{\cancel{572}}}{9} \times \frac{25}{\underset{\underset{253}{\cancel{2783}}}{\cancel{5566}}} = \frac{650}{2277}.$$

(25)

$65\frac{1}{8} + 18\frac{2}{25} = \$83\frac{41}{200}$;

$$83\frac{41}{200} \div 36\frac{1}{4} = \frac{16641}{\underset{50}{\cancel{200}}} \times \frac{\cancel{4}}{145} = 2\frac{2141}{7250}, \textit{ Ans.}$$

ADDITION OF DECIMALS.

(1)
4.035
763.196
445.3741
91.3754
1303.9805 *Ans.*

(2)
365.103113
.76012
1.34976
.3549
61.11
428.677893 *Ans.*

(3)
67.407
97.004
4.
.6
.06
.3
169.371 *Ans.*

(6)
27.
14.
49.
126.
999.
.469
.2614
1215.7304 *Ans.*

(8)
99.
99.
31.
.25
60.102
.29
100.347
389.989 *Ans.*

(10)
29.3
465.
.221
494.521 *Ans.*

(11)
.1
.01
.001
.111 *Ans.*

(12)
.25
.365
.6
.000009
1.215009 *Ans.*

(13)
23000010.
1000.
.400
27.
.000019
7.
.5
23001044.900019 *Ans*

(14)
.000006
.0004
.00019
.16
.4
.560596 *Ans.*

(15)
69000.069
4700.047
85.85
649.0649
74435.0309 *Ans.*

(16)
2785.625
3964.75
5762.1875
4960.50
6912.375
9156.3125
33541.7500 *Ans.*

(17)
3.75
14.165
375.16247
54.8125
18.5
21.75
25.
513.13997 *Ans.*

(18)
240.17
315.875
87.416
195.125
269.1875
291.06
197.0106
300.47925
200.
2096.32335 *Ans.*

(19)
475.62
.912
.460
37899.
.000199
176942.125
.0296
Ans. 215318.146799

SUBTRACTION.

(1)
3295.0000
.0879
3294.9121 *Ans.*

(4)
396.0000
.0008
395.9992 *Ans.*

(5)
1.
.001
.999 *Ans.*

(6)
6378.0
.1
6377.9 *Ans*

(7)
365.0075
.000003
365.007497 *Ans.*

(8)
21.0040
.0097
20.9943 *Ans.*

(9)
260.4709000
.0000047
260.4708953 *Ans.*

(10)
10.030200
.000019
10.030181 *Ans.*

(11)
2.0100
.0006
2.0094 *Ans.*

(12)
35000.000
.035
34999.965 *Ans.*

(16)
107.0000
.0007
106.9993 *Ans.*

(17)
1.5000
.3785
1.1215 *Ans*

MULTIPLICATION.

(1)

$$\begin{array}{r} 3.049 \\ .012 \\ \hline 6098 \\ 3049 \\ \hline .036588 \end{array}$$ *Ans.*

(2)

$$\begin{array}{r} 365.491 \\ .001 \\ \hline .365491 \end{array}$$ *Ans.*

(3)

$$\begin{array}{r} 496.0135 \\ 1.496 \\ \hline 29760810 \\ 44641215 \\ 19840540 \\ 4960135 \\ \hline 742.0361960 \end{array}$$ *Ans.*

(4)

1.000001 × .001 = .001000001, *Ans.*

(5)

.000147 × .000001 = .000000000147, *Ans.*

(6)

300.27 × 31 = 9308.37, *Ans.*

(8)

.5 × .5 = .25, *Ans.*

(9)

.5 × .005 = .0025, *Ans.*

(12)

2.75 × 6.29 = 17.2975, *Ans.*

(13)

.234 × 61 = 14.274, *Ans.*

(14)

12.836 × .354 = 4.543944, *Ans.*

(16)

4.6 × 1234 = 5676.4, *Ans.*

(17)

.125 × 375.6 = 46.9500, *Ans*

(18)

.029 × 36.251 = 1.051279, *Ans.*

(21)

.004 × .004 = .000016, *Ans.*

(23)

26.000375 × .00007 = .00182002625, *Ans.*

DIVISION.

(1)

2.11) 2.3421 (1.11, *Ans.*
211
232
211
211
211

(2)

3.01) 12.82561 (4.261, *Ans.*
1204
785
602
1836
1806
301
301

(4)

.01) .010001
1.0001, *Ans.*

(7)

0003) 37.57602
125253.4, *Ans.*

(11)

1000) .056000
.000056, *Ans.*

(13)

.0001) .1000
1000, *Ans.*

(14)

.15) 10.0000000
66.66666 +, *Ans.*

(21)

.1) 15.64
156.4, *Ans.*

(25)

.6) 6.0
10., *Ans.*

.06) 6.00
100, *Ans.*

.006) 6.000
1000, *Ans.*

(1)

7) 3.00000

.42857$\frac{1}{7}$, *Ans.*

(2)

17) 15.00000

.88235$\frac{5}{17}$, *Ans.*

(3)

35) 3.00000

.08571$\frac{3}{7}$, *Ans.*

(4)

4) 1.00

.25, *Ans.*

1129) 9.00000

.00797$\frac{87}{1129}$, *Ans.*

(5)

480) 12.000

.025, *Ans.*

39) 29.00000

.74358+, *Ans.*

$\frac{3}{1000}$ = .003, *Ans.*

(6)

$\frac{1}{2}$ = .5, *Ans.* $\frac{5}{1785}$ = .002801+, *Ans.*

(7)

$\frac{314957123}{210456891}$ = 1.49653+, *Ans.*

(8)

6) 8.00000

1.33333$\frac{1}{3}$, *Ans.*

8436) 1375.00000

.16299+, *Ans.*

4121) 3265.00000

Ans. .79228+.

(9)

$\frac{3}{4}$ of $\frac{17}{20}$ = $\frac{51}{80}$

80) 51.0000

.6375, *Ans.*

(10)

3.0 ÷ 40 = .075

4.

4.075, *Ans.*

(11)

8$\frac{17}{125}$ = 8.136, *Ans.*

(12)

$\frac{7}{800}$ = .00875, *Ans.*

(13)

$\frac{372}{1250} = .2976$, *Ans.*

(14)

$\frac{11}{1600} = .006875$, *Ans.*

(15)

$\frac{15}{1280} = .01171875$, *Ans.*

(16)

$\frac{347}{2560} = 135546875$, *Ans.*

(17)

$\frac{1}{10000} = .0001$, *Ans.*

(18)

$\frac{3476}{15625} = .222464$, *Ans.*

(1)

$.04 = \frac{4}{100} = \frac{1}{25}$, *Ans.*

(2)

$.5 = \frac{5}{10} = \frac{1}{2}$; $.25 = \frac{25}{100} = \frac{1}{4}$; $.125 = \frac{125}{1000} = \frac{1}{8}$.

(3)

$4.2 = 4\frac{2}{10} = 4\frac{1}{5}$; $.875 = \frac{875}{1000} = \frac{7}{8}$; $.375 = \frac{3}{8}$.

(4)

$8.067 = 3\frac{67}{1000}$; $8.275 = 8\frac{275}{1000} = 8\frac{11}{40}$.

(5)

$.00049 = \frac{49}{100000}$, *Ans.*

(6)

$.3125 = \frac{3125}{10000} = \frac{5}{16}$; $.75 = \frac{75}{100} = \frac{3}{4}$.

(7)

$.31\frac{1}{4} = .3125 = \frac{5}{16}$, *Ans.*

(8)

$.45\frac{3}{8} = .45375 = \frac{45375}{100000} = \frac{363}{800}$, *Ans.*

APPLICATIONS IN THE PRECEDING RULES.

1)

$$\begin{array}{rcr} 4\frac{1}{2} & = & 4.5 \\ 7\frac{5}{8} & = & 7.625 \\ 21\frac{7}{16} & = & 21.4375 \\ 12\frac{1}{3} & = & 12.33333\frac{1}{3} \\ \hline & & 45.89583\frac{1}{3} \end{array}$$

45.89583⅓, *Ans.*

(2)

$$\begin{array}{r} 6.75 \\ 14.375 \\ 14.3125 \\ 18.21875 \\ 4627.6428571\frac{3}{7} \\ \hline 4681.2991071\frac{3}{7} \end{array}$$

4681.29910713/7, *Ans.*

(3)

$$\begin{array}{r} 127.003 \\ 6.3 \\ 4.01 \\ 90.000001 \\ \hline 227.313001 \end{array}$$

227.313001, *Ans.*

(4)

$$\begin{array}{r} 60.001 \\ 39.0001 \\ 26.1 \\ \hline 125.1011 \end{array}$$

125.1011, *Ans.*

(5)

$5.91 \times 19 = 112.29$, *Ans.*

(6)

$5.47 \times 8.3 = 45.401$, *Ans.*

(7)

$2 \times .375 = \$.750$, *Ans.*

(8)

$$\begin{array}{lcr} 4.25 \times 13.12 & = & 55.76 \\ 1.06 \times 13 & = & 13.78 \\ \hline & & \$69.54 \\ 4.07 \times 13 & = & 52.91 \\ \hline & \text{Cash} & \$16.63 \end{array}$$

Cash \$16.63, *Ans.*

(9)

$5456.75 - 4896.875 = \$559.875$, *Ans.*

(10)

$3\frac{7}{16} - 2\frac{7}{9} = 3.4375 - 2.7777\frac{7}{9} = .6597\frac{2}{9}$, *Ans.*

(11)

$25\frac{3}{4} \times 74\frac{2}{3} = 25.75 \times 74.66\frac{2}{3} = 1922.6666\frac{2}{3}$, *Ans.*

(12)

$1.25 \times 37\frac{1}{2} = 46.875$, *Ans.*

(13)

$45675.375 \times 9.75 = \$445334.90625$, *Ans.*

(14)

$28 \div 267 = \$.10486+$, *Ans.*

(15)

$1.00 \div 12 = \$.08333\frac{1}{3}$, *Ans.*

(16)

$.024 \text{ of } 24 \div .35 \text{ of } 35 = .576 \div 12.25 = .0470204+$, *Ans.*

(17)

$141 \div .75 = 188$ bushels, *Ans.*

(18)

$.000001 \div .000000001 = 1000$, *Ans.*

(19)

$$\frac{4.375}{\frac{2}{5} \text{ of } \frac{9}{2}} = 4.375 \div 1.8 = 2.4305\frac{5}{9}, \textit{ Ans.}$$

(20)

$$\frac{\frac{5}{8} \text{ of } 16.125}{4\frac{7}{8}} = 10.078125 \div 4.875 = 2.06730\frac{30}{39}, \textit{ Ans.}$$

UNITED STATES CURRENCY.

EXPRESSING CURRENCY DECIMALLY.

(1) \$39.397.

(2) \$12.003.

(3) \$147.04.

(4) \$148.004.

(5) \$4.006.

(6) \$9.069.

(7) \$10.132.

(8) \$.25.

(9) \$.1875.

(10) \$.047.

(11)

\$24.185 = 24 dollars 18 cents and 5 mills.

(12)

\$135.3125 = 135 dollars 31 cents $2\frac{5}{10}$ mills; \$0.634 = 63 cents and 4 mills; \$607.437 = 607 dollars 43 cents and 7 mills.

REDUCTION.

(1)

\$56 × 10 = 560; \$96.47 × 10 = 964.7; \$1.06 × 10 = 10 6.

(2)

\$16 × 100 = 1600; \$45.625 × 100 = 4562.5;
\$1.0875 × 100 = 108.75.

(3)

\$4.156 × 1000 = 4156; \$69 × 1000 = 69000;
\$.75 × 1000 = 750.

(1)

45689 ÷ 1000 = \$45.689, *Ans.*

(2)

6794 ÷ 100 = $67.94 ; 679.4 dimes, *Ans.*

(3)

376594 ÷ 100 = $3765.94, *Ans.*

(4)

47546 ÷ 10 = 4754.6 cents, *Ans.*

(5)

67506 ÷ 10000 = E. 6.7506, *Ans.*

(6)

37496 ÷ 1000 = $37.496, *Ans.*

(7)

47049 ÷ 1000 = $47.049, *Ans.*

(8)

8756 ÷ 10 = 875.6 dimes; $87.56, *Ans.*

ADDITION OF CURRENCY.

(1)
.047
6.210
.47
.003
$6.730, *Ans.*

(2)
4.00
.16
.87
.095
$5.125, *Ans.*

(3)
12.00
3.74
.956
$16.696, *Ans.*

(4)
67.214
10.049
6.041
.271
$83.575, *Ans*

(5)
59.316
87.425
48.872
56.708
$252.321, *Ans.*

(6)
81.053
67.412
95.376
87.064
$330.905, *Ans.*

APPLICATIONS.

(1)	(2)	(3)	(4)
6.89	30.004	75.641	26.497
25.043	104.601	27.41	17.419
1.125	85.009	9.75	27.047
40.378		19.674	28.147
$73.436, *Ans.*	$219.614, *Ans.*	$132.475, *Ans.*	$99.110, *Ans.*

(5)	(6)	(7)	(8)
15.167	375.416	630.49	.28
13.407	375.416	25.00	.78
12.75	287.55	.875	12.063
11.047	287.55	.004	8.011
	259.004		1.20
	259.004		
$52.371, *Ans.*	$1843.940, *Ans.*	$656.369, *Ans.*	$22.334, *Ans.*

(9)	(10)	(11)
1.125	.57	569.75
.756	.375	1256.875
.269	3.375	674.125
.27	9.875	962.75
2.657	.125	169.1875
2.875	.085	
$7.952, *Ans.*	$14.405, *Ans.*	$3632.6875, *Ans.*

SUBTRACTION.

(6)

6.000	9.750	.75	87.354
.001	.008	.006	.009
$5.999	$9.742	$.744	$87.345

(7)
107.003
.479
$106.524, *Ans.*

(8)
875.043
704.987
$170.056, *Ans.*

(9)
904.273
859.896
$44.377, *Ans.*

(10)
3000.00
487.50
$2512.50, *Ans*

(11)
78.000
26.003
$51.997, *Ans.*

(12)
100.00
97.50
$2.50, *Ans.*

(13)
1005.400
60.039
$945.361, *Ans.*

(14)
3005.000
98.039
$2906.961, *Ans.*

(15)
100.000
75.375
$24.625, *Ans.*

(16)
100.00
87.57
$12.43, *Ans.*

(17)
100.000
40.173
$59.827, *Ans.*

(18)
10500.000
9475.625
1267.3125
$21242.9375, cost of goods.

14500.625
8965.459
$23466.084, selling price.

23466.0840
21242.9375
$2223.1465, gain, *Ans*

(19)

35.0480
47.3125
$82.3605

147.4900
82.3605
$65 1295, *Ans.*

(20)

$$\begin{array}{r} 8975.034 \\ 695.879 \\ \hline \$8279.155 \end{array} \qquad \begin{array}{r} 10000.000 \\ 9670.913 \\ \hline \$329.087 \end{array}$$

(21)

$$\begin{array}{r} 969.801 \\ 36.999 \\ \hline \$932.802, \textit{ Ans.} \end{array}$$

MULTIPLICATION.

(1)

$6.375 × 8 = $51.000.

(2)

$.375 × 55 = $20.625.

(3)

$1.25 × 300 = $375.

(4)

$1.375 × 85.25 = $117.21875.

(5)

$2.75 × 29.75 = $81.8125.

(6)

$1.75 × 47 = $82.25.

(7)

$.025 × 450 = $11.25.

(8)

$.685 × 307 = $210.295.

(9)

$.125 × 56 × 4 = $28.00.

(10)

1.33\frac{1}{3}$ × 78 = $104.00.

(11)

$2.3125 × 18$\frac{4}{7}$ × 3 = 128.8392\frac{6}{7}$, *Ans.*

(12)

$5.9375 — $5.125 = $.8125

$.8125 × 125 = $101.5625, gain, *Ans.*

(13)

$2463.125 × 16 = $39410.00

$872.75 × 25 = $21818.75

Balance in cash, $17591.25, *Ans.*

(14)

$\$3.80 \times 6\frac{3}{8} = \$24.225$

$\$.9875 \times 6\frac{3}{8} = 6.2953125$

3.45

$\$33.9703125$, *Ans.*

DIVISION.

(7)

$\$29.68 \div 14 = \$2.12$, *Ans.*

(8)

$\$10.125 \div 27 = \$.375$, *Ans.*

(9)

$\$29.25 \div 26 = \$1.12\frac{1}{2}$, *Ans.*

(10)

$150 \times 3 = 450$; $\$63.00 \div 450 = \$.14$, *Ans.*

(11)

$252 \div 72 = \$3.50$, *Ans.*

(12)

$600 \div 26 = \$23.07692+$, *Ans.*

(13)

$\$15.75 \div 17.5 = \$.90$, *Ans.*

(14)

$\$47.3125 \div 5.75 = \$8.22826+$, *Ans.*

(15)

$67.50 \div 4.50 = 15$ tons.

(16)

$178.50 \div 7 = 25.5$ bbls.

(17)

$6.75 \div .75 = 9$ lbs.

(18)

$47.50 \div 2.375 = 20$ bbls.

(19)

$14.30 \div .44 = 32.5$ bush.

(20)

$.34 \times 2\frac{1}{2} = .85$; $13.60 \div .85 = 16$ bbls.

(21)

$\$840.00 \div 1400 = \$.60$.

(22)

$(262.50 + 52.50) \div 105 = \$3$.

(23)

$3220.00 \div 28.75 = 112$ acres.

(24)

$40.50 \div 3.375 = 12$ cords.

APPLICATIONS.—ALIQUOT PARTS OF A DOLLAR.

(1)

100 cocoa-nuts at $1 each cost $100; $100 \div 8 = \$12.50$, *Ans.*

(2)

$250 \div 4 = \$62.50$, *Ans.*

(3)

$55 \div 16 = \$3.4375$, *Ans.*

(4)

$650 \div 8 = \$81.25$, *Ans.*

(5)

$450 \div 20 = \$22.50$, *Ans.*

(6)

$6640 \div 16 = \$415$, *Ans.*

(7)

$136 \div 3 = \$45.33\frac{1}{3}$, *Ans.*

(1)

$1.125 \times 367 = \$412.875$.

(2)

$1.50 \times 2479 = \$3718.50$.

(3)

$2.375 \times 4204 = \$9984.50$.

(4)

$8.45 \times 3270 = \$27631.50$.

(5)

$2.39 \times 3204 = \$7657.56$.

(6)

$4.29 \times 694 = \$2977.26$

(1)

$4280 \times 5 = \$21.400$.

(2)

$2673 \times 2\ 25 = \$60.1425$.

(3)

10.62 × 576 = $6.11712.

(4)

1200 × 7 = $8.400.

(5)

2.45 × 6727 = $164.8115.

(6)

28.25 × 27097 = $7654.9025.

(1)

3.48 ÷ 2 = $1.74; 1.74 × 3426 = $5.96124, *Ans.*

(2)

7 ÷ 2 = $3.50; 3.50 × 6742 = $23.597, *Ans.*

(3)

30.25 ÷ 2 = 15.125; 15.125 × 6527 = $98.720875, *Ans.*

(4)

8.75 ÷ 2 = 4.375; 4.375 × 1678 = $7.34125, *Ans.*

(5)

7.37½ ÷ 2 = 3.6875; 3.6875 × 37941 = $139.9074375, *Ans.*

(1)

3769.25 ÷ 50 = $75.385.

(2)

18306.25 ÷ 725 = $25.25.

(3)

1000 ÷ 15 = 66.66666⅔.

(4)

1250 ÷ 500 = $2.50 apiece.

(1)

3560 ÷ 38.75 = 91.87096 acres.

(2)

132 ÷ 1.375 = 96 sheep.

(3)

68 ÷ 4.25 = 16 yards.

MISCELLANEOUS EXAMPLES.

(1)

$150 \div 12 = 12.5$; $12.5 \times 50 = \$625$, *Ans.*

(2)

$7.875 \div 9 = .875$; $.875 \times 6 = 5.25$; $.875 \times 8 = 7.00$;
$.875 \times 15.75 = 13.78125$.

(3)

$131.25 \div 75.875 = 1.729818$;
$1.729818 \times 9\frac{1}{4} = 16.000816+$;
$1.729818 \times 37.375 = \$64.651947750$.

(4)

$44.80 \div 320 = .14$; $.14 \times 575 = \$80.50$, *Ans.*

(5)

$216 \times 9 = 1944$ lbs.; $116.64 \div 1944 = \$.06$, *Ans.*

(6)

$\frac{5}{16}$ of $120 = \$37.50$; $\frac{11}{16}$ of $120 = \$82.50$;
$37.50 \div 3.75 = 10$ cords; $82.50 \div 4.375 = 18.857142\frac{6}{7}$ tons.

(7)

$\$\frac{7}{16} = \$.4375$;
$.1875 + .875 + .3125 + .4375 = \$1.8125$;
$2.00 - 1.8125 = \$.1875$, *Ans.*

(8)

$$\begin{array}{rlr} & & 80.75 \\ 29 \times 6 & = & 174. \\ 2.50 \times 20 & = & 75. \\ 30 \times 2 & = & 60. \\ & & 25. \\ \hline & & \$414.75 \end{array}$$

$\$414.75$, *Ans.*

(9)

29 × 20 × 6 = 3480 yards;
15660 ÷ 3480 = $4.50, *Ans.*

(10)

25 × 3 = 75
65
140

140 ÷ 60 = $2.33⅓, *Ans.*

(11)

3) 33000
11000 wife's share.
4) 22000
5500 child's share.

(12)

.09 × 126 = 11.34
.06 × 85 = 5.10
.37 × 6 = 2.22
1.50 × 3 = 4.50
Ans. $23.16

(13)

.62 × 40 = 24.80; 24.80 ÷ 16 = 155 lbs., *Ans*

(14)

.185 × 112 × 6 × 6 = $745.92
5.50 × 36 = 198.00
Net proceeds = $547.92

(15)

36 × 6 = $216;
2345 + 375 + 216 = $2936
520 + 1500 = 2020
Balance unpaid = $916

(16)

.5 ÷ .5 = 1; 12½ ÷ ⅛ = 12.5 ÷ .125 = 100;
81.25 ÷ .8125 = 100.

(17)

1473.194 ÷ 12 = $122.76616⅔, *Ans.*

(18)

1637.25 ÷ 9.25 = 177 bbls., *Ans.*

(19)

4.375 × 26 = 113.75; 113.75 ÷ 7.25 = $15.68\frac{28}{29}$, *Ans.*

(20)

.45 × 46 = $20.70; 20.70 ÷ .225 = 92 gals., *Ans.*

(21)

4.125 × 6 = $24.75; 24.75 ÷ 1.25 = 19.8 days, *Ans.*

(22)

2462 × 7. ÷ 1000 = $17.234
4520 × 9.50 ÷ 1000 = 42.940
600 × 11.37 ÷ 1000 = 6.822
900 × 15. ÷ 1000 = 13.500
1464 × .75 ÷ 100 = 10.98
1012 × 1.25 ÷ 100 = 12.65

Ans. $104.126

(23)

.85 × 16 = $13.60
.155 × 27 = 4.185
.66 × 15 = 9.90

Ans. $27.685

(24)

.095 × 36 = $3.42
.27 × 63 × 3 = 51.03
.05 × 285 × 5 = 71.25
.96 × 86 × 2 = 165.12

Total cost, $290.82

(25)

55.65 × 69 = $3839.85
.125 × 100 × 126 = 1575.00
2.75 × 167 = 459.25
18.50 × 800 = 14800.00
7.50 × 9004 = 67530.00
1.08 × 32 × 60 = 2073.60

Amount, $90277.70

DENOMINATE NUMBERS.

REDUCTION ASCENDING.

(2)

$31 \times 20 + 8 = 628\text{s.}$
$628 \times 12 + 9 = 7545\text{d.}$
$7545 \times 4 + 3 = 30183\text{far.}$

(3)

$87 \times 20 + 14 = 1754\text{s.}$
$1754 \times 12 + 8 = 21056\text{d.}$
$21056 \times 4 + 2 = 84226\text{far}$

(4)

$407 \times 20 + 19 = 8159\text{s.}$
$8159 \times 12 + 11 = 97919\text{d.}$
$97919 \times 4 + 3 = 391679\text{far.}$

(5)

$80 \times 21 = 1680\text{s.}$
$1680 \div 20 = 84£$

(6)

$1549 \div 4 = 387\text{d. } 1\text{far.}$
$387 \div 12 = 32\text{s. } 3\text{d.}$
$32 \div 20 = 1£ \ 12\text{s.}$

(7)

$6169 \div 12 = 514\text{s. } 1\text{d.}$
$514 \div 20 = 25£ \ 14\text{s.}$

UNITS OF LENGTH.

(3)

$59 \times 8 + 7 = 479 \text{ fur.}$
$479 \times 49 + 38 = 19198 \text{ rds.}$
$19198 \times 5\frac{1}{2} = 105589 \text{ yds.}$
$105589 \times 12 = 316767 \text{ ft.}$

(4)

$115188 \div 40 = 2879 \text{ fur. } 28 \text{ rds.}$
$2879 \div 8 = 359 \text{ mi. } 7 \text{ fur.}$

(5)

$719 \times 8 = 5752 \text{ fur.}$
$5752 \times 40 + 16 = 230096 \text{ rds.}$
$230096 \times 5\frac{1}{2} + 6 = 1265534 \text{ yds.}$
$1265534 \times 3 = 3796602 \text{ ft.}$

(6)

$118 \times 69\frac{1}{2} = 8201$ mi., *Ans.*

(7)

$54 \times 69\frac{1}{2} + 45 = 3798$ mi.
$3798 \times 8 + 7 = 30391$ fur.
$30391 \times 40 + 20 = 1215660$ rds.
$1215660 \times 5\frac{1}{2} + 4 = 6686134$ yds.
$6686134 \times 3 + 2 = 20058404$ ft.
$20058404 \times 12 + 10 = 240700858$ in.

(8)

$481401716 \div 12 = 40116809$ ft. 8 in.
$40116809 \div 3 = 13372269$ yds. 2 ft.
$13372269 \div 5\frac{1}{2} = 2431321$ rds. $3\frac{1}{2}$ yds.
$2431321 \div 40 = 60783$ fur. 1 rd.
$60783 \div 8 = 7597$ mi. 7 fur.
$7597 \div 69\frac{1}{2} = 109°$ $21\frac{1}{2}$ mi.

(9)

$65 \times 6 + 5 = 395$ ft.
$395 \times 12 + 4 = 4744$ in.

(10)

$15\frac{1}{2} \times 4 = 62$ in.
$62 \div 12 = 5$ ft. 2 in.

(1)

$560 \div 100 = 5$ ch. 60 l., *Ans.*

(2)

$40 \times 100 + 65 = 4065$ l.
$4065 \times 7.92 = 32194.8$ in.
$32194.8 \div 12 = 2682$ ft. 10.8 in.

(3)

65 ch. 15 l. + 21 ch. 14 l. = 86 ch. 29 l.
86 ch. 29 l. × 2 = 172 ch. 58 l.

(1)

$35 \times 4 + 3 = 143$ qrs.
$143 \times 4 + 3 = 575$ na.

(2)

$575 \div 4 = 143$ qrs. 3 na.
$143 \div 4 = 35$ yds. 3 qrs.

(3)

$49 \times 5 = 245$ qrs.
$245 \times 4 = 980$ na.

(4)

$51 \times 3 + 2 = 155$ qrs.
$155 \times 4 + 3 = 623$ na.

(5)

$3278 \div 4 = 819$ qrs. 2 na.
$819 \div 4 = 204$ yds. 3 qrs.

(6)

$340 \div 4 = 85$ qrs.
$85 \div 3 = 28$ E. Flem. 1 qr.

(7)

$4311 \div 2\frac{1}{4} = 1916$ na.
$1916 \div 4 = 479$ qrs.
$479 \div 5 = 95$ E. E. 4 qrs., *Ans.*

UNITS OF SURFACE.

(3)

$19 \times 4 + 2 = 78$ R.
$78 \times 40 + 37 = 3157$ P.

(4)

$175 \times 16 = 2800$ P.
$2800 \times 272\frac{1}{4} = 762300$ sq. ft.

(5)

$37456 \div 144 = 260$ sq. ft. 16 sq. in. $= 260\frac{1}{9}$ sq. ft., *Ans.*

(6)

$14972 \div 40 = 374$ R. 12 P.
$374 \div 4 = 93$ A. 2 R.

(7)

$8674139 \div 40 = 91853$ R. 19 P.
$91853 \div 4 = 22963$ A. 1 R.
$22963 \div 640 = 35$ sq. mi. 563 A.

(8)

$104 \times 4 + 3 = 419$ R.
$419 \times 40 + 19 = 16779$ P.
$.75 \times 16779 = \$12584.25$, *Ans.*

(9)

sq. ft.
$25 \times 9 = 225$ = sq. meas. of 1 wall.
$225 \times 4 = 900$ = " 4 "
$25 \times 25 = 625$ = " ceiling.
1525 = " both.

$1525 \div 9 = 169\frac{4}{9}$ sq. yds.; $.09 \times 169\frac{4}{9} = \$15.25$, cost, *Ans*

UNITS OF VOLUME OR CAPACITY.

(3)

$7 \times 7 \times 7 = 343$ cu. ft.
$343 \times 1728 = 592704$ cu. in. blocks, *Ans.*

(4)

$25 \times 8 = 200$ C. ft.
$200 \times 16 = 3200$ cu. ft.

(5)

$28 \times 4 \times 6 = 672$ cu. ft. sol. meas. pile.
$672 \div 128 = 5$ C. 32 cu. ft.
5 C. 32 cu. ft. = 5 C. 2 c. ft., *Ans.*

(6)

$174964 \div 8 = 21870$ C. 4 c. ft., *Ans.*

(7)

$17645900 \div 1728 = 10211$ cu. ft. 1292 cu. in.
$10211 \div 50 = 204$ T. 11 cu. ft.

(3)

$12 \times 2 + 1 = 25$ hhds.
$25 \times 63 = 1575$ gals.
$1575 \times 4 + 1 = 6301$ qts.
$6301 \times 2 = 12602$ pts., *Ans.*

(4)

$10584 \div 4 = 2646$ gals.
$2646 \div 63 = 42$ hhds.
$42 \div 2 = 21$ pi.
$21 \div 2 = 10$ T. 1 pi., *Ans.*

(5)

$201632 \div 4 = 50408$ pts.
$50408 \div 2 = 25204$ qts.
$25204 \div 4 = 6301$ gals.
$6301 \div 63 = 100$ hhds. 1 gal.
$100 \div 4 = 25$ T. *Ans.* 25 T. 1 gal.

(6)

$3 \times 2 + 1 = 7$ bar.
$7 \times 31\frac{1}{2} + 8 = 228\frac{1}{2}$ gals.
$228\frac{1}{2} \times 4 + 2 = 916$ qts.
$.04 \times 916 = \$36.64$, *Ans.*

(3)

$372 \times 4 = 1488$ pks.
$1488 \times 8 = 11904$ qts.
$11904 \times 2 = 23808$ pts.

(4)

$5 \times 36 + 31 = 211$ bush.
$211 \times 4 = 844$ pks.

(5)

$17408 \div 2 = 8704$ qts.
$8704 \div 8 = 1088$ pks.
$1088 \div 4 = 272$ bush.

(6)

$4220 \div 2 = 2110$ qts.
$2110 \div 8 = 263$ pks. 6 qts.
$263 \div 4 = 65$ bush. 3 pks.
$65 \div 36 = 1$ ch. 29 bush.
Ans. 1 ch. 29 bush. 3 pks. 6 q

UNITS OF WEIGHT.

(3)

$5 \times 20 + 8 = 108$ cwt.
$108 \times 4 + 3 = 435$ qrs.
$435 \times 25 + 24 = 10899$ lbs.
$10899 \times 16 + 13 = 174397$ oz.
$174397 \times 16 + 14 = 2790366$ dr., *Ans.*

(4)

$28 \times 20 + 4 = 564$ cwt.
$564 \times 4 + 1 = 2257$ qrs.
$2257 \times 25 + 21 = 56446$ lbs.
$56446 \times 16 = 903136$ oz., *Ans.*

(5)

$2790366 \div 16 = 174397$ oz. 14 dr.
$174397 \div 16 = 10899$ lbs. 13 oz.
$10899 \div 25 = 435$ qrs. 24 lbs.
$435 \div 4 = 108$ cwt. 3 qrs.
$108 \div 20 = 5$ T. 8 cwt.

(6)

$903136 \div 16 = 56446$ lbs.
$56446 \div 25 = 2257$ qrs. 21 lbs.
$2257 \div 4 = 564$ cwt. 1 qr.
$564 \div 20 = 28$ T. 4 cwt.

(7)

$3124446 \div 16 = 195277$ oz. 14 dr.
$195277 \div 16 = 12204$ lbs. 13 oz.
$12204 \div 25 = 488$ qrs. 4 lbs.
$488 \div 4 = 122$ cwt. 0 qrs.
$122 \div 20 = 6$ T. 2 cwt.

(8)

$93 \times 20 + 13 = 1873$ cwt.
$1873 \times 4 + 3 = 7495$ qrs.
$7495 \times 25 + 8 = 187383$ lbs.
$187383 \times 16 = 2998128$ oz., *Ans.*

(9)

$108910592 \div 16 = 6806912$ oz.
$6806912 \div 16 = 425432$ lbs.
$425432 \div 25 = 17017$ qrs. 7 lbs.
$17017 \div 4 = 4254$ cwt. 1 qr.
$4254 \div 20 = 212$ T. 14 cwt.

(10)

$11 \times 20 + 17 = 237$ cwt.
$237 \times 4 + 3 = 951$ qrs.
$951 \times 25 + 24 = 23799$ lbs.
$23799 \times .00\frac{1}{2} = \$118.995$, *Ans.*
1 T. = 2000 lbs.; $2000 \times .005 = \$10.00$, *Ans.*

(11)

$2 \times 20 + 13 = 53$ cwt.
$53 \times 4 + 3 = 215$ qrs.
$215 \times 25 + 21 = 5396$ lbs.
$5396 \times .08 = \$431.68$, *Ans.*
1 T. = 2000 lbs.; $2000 \times .08 = \$160.00$, *Ans.*

(3)

$25 \times 12 + 9 = 309$ oz.
$309 \times 20 = 6180$ pwt.
$6180 \times 24 + 20 = 148340$ grs., *Ans.*

(4)

$6490 \div 24 = 270$ pwt. 10 grs.
$270 \div 20 = 13$ oz. 10 pwt.
$13 \div 12 = 1$ lb. 1 oz.
1 lb. 1 oz. 10 pwt. 10 grs. = *Ans.*

(5)

148340 ÷ 24 = 6180 pwt. 20 grs.
6180 ÷ 20 = 309 oz. 0 pwt.
309 ÷ 12 = 25 lbs. 9 oz.

25 lbs. 9 oz. 0 pwt. 20 grs. = *Ans.*

(6)

117 × 12 + 9 = 1413 oz.
1413 × 20 + 15 = 28275 pwt.
28275 × 24 + 18 = 678618 grs., *Ans.*

(7)

8794 ÷ 20 = 439 oz. 14 pwt.
439 ÷ 12 = 36 lbs. 7 oz.

36 lbs. 7 oz. 14 pwt., *Ans.*

(8)

6 × 12 + 9 = 81 oz.
81 × 20 = 1620 pwt.
1620 × 24 + 21 = 38901 grs., *Ans.*

(9)

1 × 12 + 1 = 13 oz.
13 × 20 + 10 = 270 pwt.
270 × 24 + 16 = 6496 grs., *Ans.*

(10)

2 × 20 + 14 = 54 pwt.
54 × 24 + 18 = 1314 grs.
1314 × $\frac{1}{2}$ = $657, *Ans.*

(3)

27 × 12 + 9 = 333 ℥.
333 × 8 + 6 = 2665 ʒ.
2665 × 3 + 1 = 8011 ℈, *Ans.*

(4)

94 × 12 + 11 = 1139 ℥
1139 × 8 + 1 = 9113 ʒ
Ans

(5)

8011 ÷ 3 = 2670ʒ 1℈.
2670 ÷ 8 = 333℥ 6ʒ.
333 ÷ 12 = 27℔ 9℥.

27℔ 9℥ 6ʒ 1℈, *Ans.*

(6)

9113 ÷ 8 = 1139℥ 1ʒ.
1139 ÷ 12 = 94℔ 11℥.

94℔ 11℥ 1ʒ, *Ans.*

(7)

12 × 12 + 9 = 153℥.
153 × 8 + 7 = 1231ʒ.
1231 × 3 + 2 = 3695℈.
3695 × 20 + 18 = 73918 grs.

(8)

73918 ÷ 20 = 3695℈ 18 grs.
3695 ÷ 3 = 1231ʒ 2℈.
1231 ÷ 8 = 153℥ 7ʒ.
153 ÷ 12 = 12℔ 9℥.

Ans. 12℔ 9℥ 7ʒ 2℈ 18 grs.

UNITS OF TIME.

(3)

365 × 24 + 23 = 8783 hrs.
8783 × 60 + 57 = 527037 min.
527037 × 60 + 39 = 31622259 sec.
31622259 × 12 = 379467108 sec., *Ans.*

(4)

126230400 ÷ 60 = 2103840 min.
2103840 ÷ 60 = 35064 hrs.
35064 ÷ 24 = 1461 days.
1461 ÷ 365 = 4 yrs. 1 da., *Ans.*

(5)

756952018 ÷ 60 = 12615866 min. 58 sec.
12615866 ÷ 60 = 210264 hrs. 26 min.
210264 ÷ 24 = 8761 days 0 hrs.
8761 ÷ 365 = 24 yrs. 1 da.

24 yrs. 1 da. 0 hrs. 26 min. 58 sec., *Ans.*

(6)

365 da. 6 hrs. = 8766 hrs.
$285290205 \div 60 = 4754836$ min. 45 sec.
$4754836 \div 60 = 79247$ hrs. 16 min.
$79247 \div 8766 = 9$ yrs. 353 hrs.
353 hrs. = 14 da. 17 hrs.

9 yrs. 14 da. 17 hrs. 16 min. 45 sec., *Ans.*

(7)

$30 + 31 + 30 + 31 + 31 + 30 + 31 + 30 + 31 = 275$ da.;
$275 \times 24 = 6600$ hrs., *Ans.*

CIRCULAR MEASURE.

(1)

$5 \times 30 + 29 = 179°$.
$179 \times 60 + 25 = 10765'$, *Ans.*

(2)

$2 \times 12 = 24$ s.
$24 \times 30 = 720°$.
$720 \times 60 = 43200'$.
$43200 \times 60 = 2592000''$.

(3)

$27894 \div 60 = 464'\ 54''$.
$464 \div 60 = 7°\ 44'$.

7° 44′ 54″, *Ans.*

(4)

$32295 \div 60 = 538°\ 15'$.
$538 \div 30 = 17$ s. 28°.
$17 \div 12 = 1$ c. 5 s.

1 c. 5 s. 28° 15′, *Ans.*

(5)

$3 \times 360 + 16 = 1096°$.
$1096 \times 60 + 20 = 65780'$.
$65780 \times 60 = 3946800''$, *Ans.*

(6)

$8 \times 30 + 16 = 256°$.
$256 \times 60 = 15360'$.
$15360 \times 60 + 25 = 921625''$, *Ans.*

(7)

$8589 \div 60 = 143'\ 9''$.
$143 \div 60 = 2°\ 23'$.
2° 23′ 9″, *Ans.*

MISCELLANEOUS EXAMPLES.

(1)

$24 \times 18 = 432$ sq. ft.
$432 \times 144 = 62208$ sq. in., *Ans.*

(2)

$24 \times 18 = 432$ sq. ft.
$432 \div 9 = 48$ sq. yds
$.50 \times 48 = \$24$, *Ans*

(3)

$28 \times 4 \times 6 = 672$ cu. ft.
$672 \div 128 = 5\frac{1}{4}$ C.

(4)

$9 \times 2\frac{1}{2} \times 1\frac{1}{4} = 28.125$ cu. ft

(5)

$16 \times 11 \times 10 = 1760$ cu. ft.
$1760 \times 1728 = 3041280$ cu. in.
$3041280 \div 231 = 13165\frac{165}{231}$ gals., *Ans.*

(6)

$82 \times 18 \times 4 = 5904$ cu. ft.
$5904 \div 128 = 46\frac{1}{8}$ C.
$3.75 \times 46\frac{1}{8} = \$172.96875$, *Ans.*

(7)

$14 \times 8 \times 12 = 1344$ cu. ft.
$1344 \times 1728 = 2322432$ cu. in.
$2322432 \div 64 \; (= 8 \times 4 \times 2) = 36288$, *Ans.*

(8)

$63 \times 4 = 252$ qts.
$252 \times 2 = 504$ pts.
$504 \times 2 = 1008$ hf. pts.
$1008 \div 3 = 336$, *Ans.*

(9)

2 hhds. 24 gals. 2 qts. $= 3122$ qts.
3 gals. 2 qts. $= 14$ qts.
$3122 \div 14 = 223$ pails, *Ans.*

(10)

$372\frac{3}{4} \times 4 = 1491$ pks.
$1491 \times 8 = 11928$ qts.
$11928 \times 2 = 23856$ pts., *Ans.*

(11)

$2 \times 4 \times 8 \times 2 = 128$ pts.
$128 \times .04 = \$5.12$.
$6 - 5.12 = \$.88$, loss, *Ans.*

(12)

1 A. = 6272640 sq. in.
$4044896 \div 6272640 = .6448$ A., *Ans.*
$75.1875 \times .6448 = \$48.4809$, *Ans.*

(13)

$100 \times 25 = 2500$ sq. ft.
$2500 \times 250 = 625000$ sq. ft.
1 A. = 43560 sq. ft.
$625000 \div 43560 = 14.34802$ A., *Ans.*

(14)

$52\frac{1}{7} \times 6 + 32 = 344\frac{6}{7}$ wks.
$344\frac{6}{7} \times 7 + 6 = 2420$ da.
$2420 \times 24 + 17 = 58097$ hrs., *Ans.*

(15)

$811480 \div 60 = 13524' \ 40''$.
$13524 \div 60 = 225^\circ \ 24'$.
$225 \div 30 = 7$ s. 15°.

7 s. $15^\circ \ 24' \ 40''$, *Ans.*

(16)

$2654208 \div 1728 = 1536$ cu. ft.
$1536 \div 128 = 12$ C., *Ans.*

(17)

18 × 40 = 720 cu. ft.
720 × 1728 = 1244160 cu. in., *Ans.*

(18)

84 × 36 = 3024 bush.
3024 × 4 = 12096 pks.
12096 ÷ 3.5 = 3456 bags, *Ans.*

(19)

302 × 5 = 1510 qrs.
1510 ÷ 4 = 377 yds. 2 qrs., *Ans.*

(20)

24 × 63 + 18 = 1530 gals.
1530 × 4 + 2 = 6122 qts.
6122 × 2 = 12244 pts.
12244 × 4 = 48976 gills, *Ans.*

(21)

76 × 4 + 1 = 305 R.
305 × 40 + 8 = 12208 P.
12208 × $30\frac{1}{4}$ = 369292 sq. yd.
369292 × 9 = 3323628 sq. ft.
3323628 × 144 = 478602432 sq. in., *Ans.*

(22)

445577 ÷ 3 = 148525 yds. 2 ft.
148525 ÷ $5\frac{1}{2}$ = 27004 rds. 3 yds.
27004 ÷ 40 = 675 fur. 4 rds.
675 ÷ 8 = 84 mi. 3 fur.

84 mi. 3 fur. 4 rds. 3 yds. 2 ft., *Ans.*

(23)

$37444325 \div 144 = 260030$ sq. ft. 5 sq. in.

$260030 \div 9 = 28892$ sq. yds. 2 sq. ft.

$28892 \div 30\frac{1}{4} = 955$ P. $3\frac{1}{4}$ sq. yds.

$955 \div 40 = 23$ R. 35 P.

$23 \div 4 = 5$ A. 3 R.

5 A. 3 R. 35 P. $3\frac{1}{4}$ sq. yds. 2 sq. ft. 5 sq. in., *Ans.*

(24)

16 ft. 6 in. = 198 in.

84 mi. = 5322240 in.

$5322240 \div 198 = 26880$ times, *Ans.*

(25)

$28 \times 272\frac{1}{4} + 129 = 7752.$

$7752 \times 15 = \$116280$, *Ans.*

(26)

$36 \times 6 \times 4 = 864$ cu. ft.

$864 \div 16 = 54$ c. ft.

$.50 \times 54 = \$27.00$, *Ans.*

(27)

$6 \times 12 = 72$ hrs.

$288 \div 72 = 4$ mi., *Ans.*

(28)

$18 \times 20 = 360$ sq. ft.

$360 \div 3 = 120$ ft. length.

$120 \div 3 = 40$ yds., *Ans.*

(29)

$24000000 \div 100 = 240000$ min.

$240000 \div 60 = 4000$ hrs.

$4000 \div 24 = 166$ da. 16 hrs.

$166 \div 7 = 23$ wk. 5 da.

23 wks. 5 da. 16 hrs., *Ans.*

(30)

$126 \times 4 = 504$ qts.
$504 \times 2 = 1008$ pts.
$1008 \div 1\frac{3}{4} = 576$ bottles, *Ans.*

(31)

$4 \times 4 \times 4 = 64$ cu. ft.
$64 \times 1728 = 110592$, *Ans.*

(32)

$285 \times 4 = 1140$ pks.
7 bu. 2 pk. = 30 pks.
$1140 \div 30 = 38$ casks, *Ans.*

(33)

$648 \div 18 = 36$ ft. length, *Ans.*

(34)

$9 \div 12 = \frac{9}{12} = \frac{3}{4}$ ft. = 9 in., *Ans.*

(35)

$34 \times 25 \times 8 = 6800$ sq. ft.
$6800 \div 27 \times 3 = 755\frac{15}{27}$ loads, *Ans.*

(36)

$25 \times 10 = 250$ sq. ft.
$250 \times 144 = 36000$ sq. in.
$36000 \div 32 = 1125$ bricks, *Ans.*

DENOMINATE FRACTIONS.

(2)

$$\frac{7}{\cancel{12}} \times \frac{20}{1} \times \frac{\cancel{12}}{1} = \frac{140}{1}\text{d., } \textit{Ans.}$$

(3)

$$\begin{array}{l}\dfrac{3}{\cancel{4}8\cancel{0}\cancel{0}} \times \dfrac{\cancel{20}}{1} \times \dfrac{\cancel{12}}{1} \times \dfrac{\cancel{4}}{1} = \frac{3}{5}\text{ far., } \textit{Ans.}\\ \ 2\cancel{4}\cancel{0}\\ \ \ 2\cancel{0}\\ \ \ \ 5\end{array}$$

(4)

$$\underset{19}{\frac{3}{\cancel{76}}} \times \frac{5}{1} \times \frac{\cancel{4}}{1} = \frac{15}{19} \text{ na., } \textit{Ans.}$$

(5)

$$\underset{\substack{\cancel{72}\\ \cancel{18}\\ 6}}{\frac{\cancel{3}}{\cancel{648}}} \times \frac{\overset{7}{\cancel{63}}}{1} \times \frac{\cancel{4}}{1} = \frac{7}{6} = 1\tfrac{1}{6} \text{ qt., } \textit{Ans.}$$

(6)

$$\underset{\substack{\cancel{10}\\ 5}}{\frac{4}{\cancel{320}}} \times \frac{\cancel{4}}{1} \times \frac{\cancel{8}}{1} \times \frac{\cancel{2}}{1} = \frac{4}{5} \text{ pt., } \textit{Ans.}$$

(7)

$$\underset{\substack{\cancel{720}\\ \cancel{36}\\ 3}}{\frac{1}{\cancel{8640}}} \times \frac{\cancel{12}}{1} \times \frac{\cancel{20}}{1} \times \frac{\overset{2}{\cancel{24}}}{1} = \frac{2}{3} \text{ gr., } \textit{Ans.}$$

(8)

$$\underset{\substack{\cancel{1600}\\ \cancel{64}\\ \cancel{16}\\ 8}}{\frac{\overset{7}{\cancel{14}}}{\cancel{256000}}} \times \frac{\cancel{4}}{1} \times \frac{\cancel{25}}{1} \times \frac{\cancel{16}}{1} = \frac{7}{8} \text{ oz., } \textit{Ans.}$$

(9)

$$.125 \times 4 \times 25 \times 16 = 200 \text{ oz., } \textit{Ans.}$$

(10)

$$.3125 \times 8 \times 40 \times 5\tfrac{1}{2} \times 3 \times 12 = 19800 \text{ in., } \textit{Ans.}$$

(11)

$$.1875 \times 24 \times 60 = 270 \text{ min., } \textit{Ans.}$$

(12)

$$.29763 \times 60 \times 60 = 1071.468'', \textit{ Ans.}$$

(13)

$$.1723 \times 12 \times 20 \times 24 = 992.448 \text{ grs., } \textit{Ans.}$$

(14)

$$2.333 \times 20 \times 12 = 559.92 \text{d., } \textit{Ans.}$$

(2)

$$\tfrac{4}{5} \times \tfrac{1}{63} = \tfrac{4}{315} \text{ hhd., } \textit{Ans.}$$

(3)

$$\tfrac{5}{9} \times \tfrac{1}{4} \times \tfrac{1}{4} = \tfrac{5}{144} \text{ yd., } \textit{Ans.}$$

(4)

$$\tfrac{1}{3} \text{ of } \frac{\cancel{4}}{5} \times \frac{1}{3} \times \frac{\cancel{2}}{11} \times \frac{1}{\underset{10}{\cancel{40}}} \times \frac{1}{\underset{4}{\cancel{8}}} = \tfrac{1}{19800} \text{ mi., } \textit{Ans.}$$

(5)

$$\tfrac{7}{8} \text{ of } \frac{\cancel{10}}{3} \times \frac{1}{\underset{2}{\cancel{20}}} \times \frac{1}{\cancel{12}} = \tfrac{7}{576} \text{ lb., } \textit{Ans.}$$

(6)

$$.3125 \times \tfrac{1}{2} \times \tfrac{1}{4} = .0390625 \text{ gal., } \textit{Ans.}$$

(7)

$$.89725 \times \tfrac{1}{16} \times \tfrac{1}{25} \times \tfrac{1}{4} = .000560781\tfrac{1}{4} \text{ cwt., } \textit{Ans.}$$

(8)

$$.9825 \times \tfrac{1}{12} \times \tfrac{1}{20} = .00409375 \text{ £, } \textit{Ans.}$$

(9)

$6.875 \times \frac{1}{60} \times \frac{1}{60} \times \frac{1}{24} = .00007957$ da.+, *Ans.*

(10)

$27.9175 \times \frac{1}{4} \times \frac{1}{4} = 1.74484375$ yd., *Ans.*

(11)

$262.318125 \times \frac{1}{3} \times \frac{2}{11} \times \frac{1}{40} \times \frac{1}{8} = .0496814$ mi.+, *Ans.*

(12)

$.009375 \times \frac{1}{2} \times \frac{1}{8} \times \frac{1}{4} = .000146484\frac{3}{4}$ bu., *Ans.*

(13)

$7 \times \frac{1}{16} \times \frac{1}{16} = .02734375$ lb., *Ans.*

(14)

$.056 \times \frac{1}{40} \times \frac{1}{4} = .00035$ A., *Ans.*

(15)

$14 \times \frac{1}{60} \times \frac{1}{24} = .0097222$ da.+, *Ans.*

(16)

$21 \times \frac{1}{2} \times \frac{1}{8} = 1.3125$ pk., *Ans.*

(17)

$375678 \times \frac{1}{3} \times \frac{2}{11} \times \frac{1}{40} \times \frac{1}{8} = 71.151136$ mi.+, *Ans.*

(18)

$.5 \times \frac{1}{4} \times \frac{1}{31\frac{1}{2}} = .5 \times \frac{1}{4} \times \frac{2}{63} = .003968$ bar.+, *Ans.*

(1)

$\frac{7}{8} \times 4 = \frac{28}{8} = 3\frac{4}{8}$ hhds.; $\frac{4}{8} \times 63 = \frac{252}{8} = 31\frac{4}{8}$ gals.;
$\frac{4}{8} \times 4 = \frac{16}{8} = 2$ pts. 1pi. 1 hhds. 31 gals. 2 pts., *Ans.*

(2)

$\frac{9}{10} \times 4 = \frac{36}{10} = 3\frac{6}{10}$ qrs.; $\frac{6}{10} \times 4 = \frac{24}{10} = 2\frac{4}{10}$ na.;
$\frac{4}{10} \times 2\frac{1}{4} = \frac{9}{10} = .9$ in. 3 qrs. 2 na. 0.9 in., *Ans.*

(3)

$\frac{4}{5} \times 4 = \frac{16}{5} = 3\frac{1}{5}$ wk.; $\frac{1}{5} \times 7 = \frac{7}{5} = 1\frac{2}{5}$ da.;
$\frac{2}{5} \times 24 = \frac{48}{5} = 9\frac{3}{5}$ hrs.; $\frac{3}{5} \times 60 = \frac{180}{5} = 36$ min.
3 wks. 1 da. 9 hrs. 36 min., *Ans.*

(4)

$\frac{3}{8} \times 36 = \frac{108}{8} = 13\frac{4}{8}$ bu.; $\frac{4}{8} \times 4 = \frac{16}{8} = 2$ pks.
13 bu. 2 pks., *Ans.*

(5)

$\frac{7}{9} \times 8 = \frac{56}{9} = 6\frac{2}{9}$ fur.; $\frac{2}{9} \times 40 = \frac{80}{9} = 8\frac{8}{9}$ rds.;
$\frac{8}{9}$ rds. $\times 5\frac{1}{2} = \frac{44}{9} = 4\frac{8}{9}$ yds.; $\frac{8}{9} \times 3 = \frac{24}{9} = 2\frac{6}{9}$ ft.;
$\frac{6}{9} \times 12 = \frac{72}{9} = 8$ in. 6 fur. 8 rds. 4 yds. 2 ft. 8 in., *Ans.*

(6)

$\frac{5}{32} \times 20 = \frac{100}{32} = 3\frac{4}{32}$ cwt.; $\frac{4}{32} \times 4 = \frac{16}{32}$ qrs.;
$\frac{16}{32} \times 25 = \frac{400}{32} = 12\frac{1}{2}$ lbs.
3 cwt. 0 qrs. $12\frac{1}{2}$ lbs. = 3 cwt. 0 qrs. 12 lbs. 8 oz., *Ans.*

(7)

$\frac{6}{7}$ of $3 = \frac{18}{7} = 2\frac{4}{7}$ da.; $\frac{4}{7} \times 24 = \frac{96}{7} = 13\frac{5}{7}$ hrs.;
$\frac{5}{7} \times 60 = \frac{300}{7} = 42\frac{6}{7}$ min.; $\frac{6}{7} \times 60 = \frac{360}{7} = 51\frac{3}{7}$ sec.
2 da. 13 hrs. 42 min. $51\frac{3}{7}$ sec., *Ans.*

(8)

$\frac{1}{2}$ of $\frac{\cancel{3}}{\cancel{4}}$ of $\frac{\overset{5}{\cancel{20}}}{\cancel{3}} = \frac{5}{2} = 2\frac{1}{2}$ bu.; $\frac{1}{2} \times 4 = \frac{4}{2} = 2$ pks.
2 bu. 2 pks., *Ans.*

(9)

$\frac{4}{5} \times 63 = \frac{252}{5} = 50\frac{2}{5}$ gals.; $\frac{2}{5} \times 4 = \frac{8}{5} = 1\frac{3}{5}$ qt.;
$\frac{3}{5} \times 2 = \frac{6}{5} = 1\frac{1}{5}$ pt.; $\frac{1}{5} \times 4 = \frac{4}{5}$ gill.
50 gals. 1 qt. 1 pt. $\frac{4}{5}$ gill, *Ans.*

(10)

$\frac{7}{15} \times 4 = \frac{28}{15} = 1\frac{13}{15}$ qrs.; $\frac{13}{15} \times 25 = \frac{325}{15} = 21\frac{10}{15}$ lbs.;
$\frac{10}{15} \times 16 = \frac{160}{15} = 10\frac{10}{15}$ oz.; $\frac{10}{15} \times 16 = \frac{160}{15} = 10\frac{10}{15}$ dr.
1 qr. 21 lbs. 10 oz. $10\frac{2}{3}$ dr., *Ans.*

(11)

$\frac{1}{30} \times 63 = \frac{63}{30} = 2\frac{3}{30}$ gals.; $\frac{3}{30} \times \frac{4}{1} = \frac{12}{30}$ qts.;
$\frac{12}{30} \times 2 = \frac{24}{30}$ pt.; $\frac{24}{30} \times 4 = \frac{96}{30} = 3\frac{6}{30}$ gills.
2 gals. 0 qt. 0 pt. $3\frac{1}{5}$ gills, *Ans.*

(12)

$\frac{7}{13} \times 4 = \frac{28}{13} = 2\frac{2}{13}$ R.; $\frac{2}{13} \times 40 = \frac{80}{13} = 6\frac{2}{13}$ P.;
$\frac{2}{13} \times 30\frac{1}{4} = \frac{60\frac{1}{2}}{13} = 4\frac{17}{26}$ sq. yds.; $\frac{17}{26} \times 9 = \frac{153}{26} = 5\frac{23}{26}$ sq. ft;
$\frac{23}{26} \times 144 = \frac{3312}{26} = 127\frac{10}{26}$ sq. in.
2 R. 6 P. 4 sq. yds. 5 sq. ft. $127\frac{5}{13}$ sq. in., *Ans.*

(13)

$\frac{15}{19} \times 20 = \frac{300}{19} = 15\frac{15}{19}$ cwt.; $\frac{15}{19} \times 4 = \frac{60}{19} = 3\frac{3}{19}$ qrs.,
$\frac{3}{19} \times 25 = \frac{75}{19} = 3\frac{18}{19}$ lbs.; $\frac{18}{19} \times 16 = \frac{288}{19} = 15\frac{3}{19}$ oz.;
$\frac{3}{19} \times 16 = \frac{48}{19} = 2\frac{10}{19}$ dr.
15 cwt. 3 qrs. 3 lbs. 15 oz. $2\frac{10}{19}$ dr., *Ans.*

(14)

$\frac{15}{16} \times 365 = \frac{5475}{16} = 342\frac{3}{16}$ da.;
$\frac{3}{16} \times 24 = \frac{72}{16} = 4\frac{8}{16} = 4$ hrs. 30 min.
342 da. 4 hrs. 30 min., *Ans.*

(1)

.002084 lbs.
12
025008 oz.
20
.500160 pwt.
24
2000640
1000320
12.003840 grs., *Ans.*

(2)

.625 cwt.
4
2.500 qrs.
25
2500
1000
12.500 lbs.
16
8.000 oz.
2 qrs. 12 lbs. 8 oz., *Ans.*

(3)

.625 gal.
4
2.500 qts.
2
1.000 pt.
2 qts. 1 pt., *Ans.*

(4)

.3375£
20
6.7500s.
12
9.0000d.
6s. 9d., *Ans.*

(5)

.3375 ton.
20
6.7500 cwt.
4
3.0000 qrs.
6 cwt. 3 qrs., *Ans.*

(6)

.05 A.
4
.20 R.
40
8.00 P., *Ans.*

(7)

.875 pi.
2
1.750 hhd.
63
2250
4500
47.250 gals.
4
1000 qt.
1 hhd. 47 gals. 1 qt., *Ans.*

(8)

.125 hhd.
63
375
750
7.875 gals.
4
3.500 qts.
7 gals. 3 qts. 1 pt., *Ans.*

(9)

.375 yr.
365
1875
2250
1125
136.875 da.
24
3500
1750
21.000 hrs.
Ans. 136 da. 21 hr.

(10)

.085£
20
1.700s.
12
8.400d.
4
1.600far.

1s. 8d. 1.6far., *Ans.*

(11)

.86 cwt.
4
3.44 qrs.
25
220
88
11.00 lbs.

3 qrs. 11 lbs., *Ans.*

(12)

$\frac{3}{8}$ of .86 = .3225.

.3225 cwt.
4
1.2900 qr.
25
14500
5800
7.2500 lbs.
16
4.0000 oz.

Ans. 1 qr. 7 lbs. 4 oz.

(13)

.82 da.
24
328
164
19.68 hrs.
60
40.80 min.
60
48.00 sec.

19 hrs. 40 min. 48 sec.
Ans.

(14)

1.089 mi.
8
.712 fur.
40
28.480 rds.
5$\frac{1}{2}$
240
2400
2.640 yds.
3
1.920 ft.
12
11.040 in.

1 mi. 28 rds. 2 yds. 1 ft. 11.04 in., *Ans.*

(15)

.09375 lb.
16
1.50000 oz.
16
8.00000 dr.

Ans. 1 oz. 8 dr.

(16)

.28493 yr.
365
142465
170958
85479
103.99945 da.
24
399780
199890
23.98680 hrs.
60
59.20800 min.
60
12.48000 sec.

103 da. 23 hrs. 59 min. 12.48 sec., *Ans.*

(17)

1.046£
20
.920s.
12
11.040d.
4
.160far.

£1 0s. 11d. 0.16far. *Ans.*

(18)

1.88£
20
17.60s.
12
7.20d.
4
.80far.

£1 17s. 7d. 0.8far. *Ans.*

(1)

8 hhd. 31 gal. 2 qt. = 882 qt.
1 tun = 1008 qt.
$\frac{882}{1008} = \frac{7}{8}$ tun, *Ans.*

(2)

3 gal. 2 qt. = 14 qt.
1 hhd. = 252 qt.
Ans. $\frac{14}{252} = \frac{1}{18}$ hhd.

(3)

2 fur. 36 rd. 2 yd. = 640 yd.
1 mile = 1760 yd.
$\frac{640}{1760} = \frac{4}{11}$ mi., *Ans.*

(4)

5s. 7⅕d. = 336 fifths of a penny.
£1 = 1200 " " "
$\frac{336}{1200} = \frac{7}{25}$£, *Ans.*

(5)

10 oz. 13 pwt. 8 gr. = 5120 gr.
1 lb. = 1760 gr.
$\frac{5120}{1760} = \frac{8}{9}$ lb., *Ans.*

(6)

11 cwt. 0 qr. 12 lb. 7 oz. 1$\frac{7}{9}$ dr. = 2563072 ninths of dram.
1 ton = 4608000 " "
$\frac{2563072}{4608000} = \frac{2503}{4500}$ ton, *Ans.*

(7)

2 R. 32 P. 8 yd. = 3396 yd.
1 A. = 4840 yd.
$\frac{3396}{4840} = \frac{849}{1210}$ A., *Ans.*

(8)

12s. 9d. 1$\frac{1}{3}$ far. = 1840 third-far.
1 G. = 3024 "
$\frac{1840}{3024} = \frac{115}{189}$ G., *Ans.*

(9)

9 tenths = .9 lb.
1 cwt. = 100.0 "
$\frac{9}{1000}$ cwt., *Ans.*

(10)

3 qrs. 3 na. 1$\frac{1}{4}$ in. = 35 in.
1 E. E. = 45 in.
Ans. $\frac{35}{45} = \frac{7}{9}$ E. E.

(11)

3° 15′ 18$\frac{3}{4}$″ = 46875 fourth-seconds.
1 sign = 432000 "
$\frac{46875}{432000} = \frac{125}{1152}$ sign, *Ans.*

(12)

$3\frac{7}{9}$ in. = 34 ninth-inches.
1 hand = 36 "
$\frac{34}{36} = \frac{17}{18}$ hand, *Ans.*

(13)

5 yd. 2 ft. 9 in. = 213 in.
1 mile = 63360 in.
Ans. $\frac{213}{63360} = \frac{71}{21120}$ mile.

(1)

60) 45.00
60) 30.7500
24) 5.5125000
7) 6.2296875
Ans. 4.8899553+

(2)

24) 16.00000
20) 12.66666
12) 5.63333
Ans. 2.46944+

(3)

12) 9.00
3) 3.75
Ans. 1.25

(4)

16) 12
16) 0.75
.046875
Ans. 1.046875

(5)

8) 2.0
3) 0.25
Ans. 5.08333+

(6)

2) 1.0
8) 0.5000
4) 3.062500
Ans. 4.765625

(7)

24) 12.0
20) 13.500
12) 5.675
Ans. .472916$\frac{2}{3}$

(8)

25) 2.5
4) 3.100
20) 15.77500
Ans. .78875

(9)

40) 21.000
4) 3.52500
Ans. 5.88125

(10)

25) 11.00
4) .44
20) .110
Ans. .0055

(11)

60) 12.60
60) 0.2100
24) 0.0035
7) 3.00014583
Ans. .42859226+

(12)

8) 3.60
4) 0.4500
36) 14.11250
Ans. .39201388$\frac{8}{9}$

(13)

40) 1.00
8) 7.025
Ans. 7.878125

(14)

4) 3.37500
12) 6.84375
20) 15.5703125
Ans. .778515625

(15)

60) 36.8125
30) 4.6135416
Ans. .15378472+

ADDITION.

APPLICATIONS.

(1)

lb.	oz.	pwt.	gr.	
46	9	15	16	
87	10	6	14	
100	10	10	10	
56	0	3	6	
291	6	15	22	*Ans.*

(6)

lb.	oz.	pwt.	gr.	
46	8	13	14	
97	3	0	0	
100	5	10	13	
244	5	4	3	*Ans.*

(7)

T.	cwt.	qr.	lb.	oz.	dr.
29	16	1	14	12	9
0	18	3	1	0	0
50	0	3	0	4	0
2	0	1	0	0	14
82	16	0	16	1	7

(8)

T.	cwt.	qr.	lb.	oz.	dr.
39	10	2	2	15	12
0	17	0	6	0	0
0	12	3	0	0	0
0	0	2	8	0	9
41	0	3	17	0	5

(9)

A.	R.	P.	sq. ft.	sq. in.
314	2	39	200	136
16	1	20	10	0
0	3	36	0	0
4	1	16	0	0
336	1	31	210	136

(10)

T.	ft.	cu. in.
64	33	800
9	0	1200
0	25	700
95	31	1500
170	11	744

(11)

bu.	pk.	qt.	pt.
96	3	2	1
46	3	1	1
0	2	1	1
23	3	4	1
168	0	2	0

(12)

A.	R.	P.	sq. ft.	sq. in.
20	3	15	250	116
19	1	39	0	0
0	2	10	60	0
5	0	6	0	50
45	3	31	38	130

(13)

bu.	pk.	qt.
37	1	3
41	2	5
35	1	3
43	3	1
158	0	4

(14)

T.	cwt.	qr.	lb.
	11	0	15
	12	3	15
	9	1	16
	12	1	0
2	5	2	21

(15)

yd.	qr.
32	3
31	1
14	2
6	2
85	0

(16)

lb.	oz.	pwt.	gr.
0	23	17	11
0	8	13	19
0	5	0	11
3	1	11	17

(17)

mi.	fur.	rd.
87	6	24
75	3	17
80	7	10
78	5	0
322	6	11

(18)

A.	R.	P.
17	1	35
36	2	21
46	0	37
100	1	13

ADDITION OF FRACTIONS.

(1)

	cwt.	qr.	lb.	oz.	dr.
$\frac{4}{7}$ ton =	11	1	17	13	$11\frac{3}{7}$
$\frac{9}{10}$ cwt. =	0	3	15	0	0
Ans.	12	1	7	13	$11\frac{3}{7}$

(2)

	fur.	rd.	yd.	ft.	in.
$\frac{2}{3}$ yd. =	0	0	0	2	0
$\frac{3}{4}$ ft. =	0	0	0	0	9
$\frac{7}{8}$ mi. =	7	0	0	0	0
Ans.	7	0	0	2	9

(3)

	mi.	fur.	rd.
$1\frac{1}{4}$ mi. =	1	2	0
$\frac{7}{10}$ fur. =	0	0	28
30 rd. =	0	0	30
Ans.	1	3	18

(4)

	cwt.	qr.	lb.	oz.
$\frac{3}{4}$ cwt. =	0	3	0	0
$\frac{42}{2}$ lb. =	0	0	21	0
13 oz. =	0	0	0	13
$\frac{1}{2}$ cwt. =	0	2	0	0
6 lb. =	0	0	6	0
Ans.	1	2	2	13

(5)

	da.	hr.	min.	sec.
$5\frac{5}{6}$ da. =	5	20	0	0
$52\frac{5}{19}$ min. =	0	0	52	$15\frac{15}{19}$
Ans.	5	20	52	$15\frac{15}{19}$

(6)

	s.	d.	far.
$\frac{5}{8}$ £ =	12	6	0
3.75s. =	3	9	0
.975d. =	0	0	3.9
Ans.	16	3	3.9

(7)

	cwt.	qr.	lb.	oz.	dr.
.2965 T. =	5	3	18	0	0
.8725 cwt. =	0	3	12	4	0
.63725 qr. =	0	0	15	14	14.4
.1625 lb. =	0	0	0	2	9.6
Ans.	6	3	21	5	8

(8)

	yd.	qr.
$18\frac{3}{4}$ yd. =	18	3
$21\frac{2}{3}$ E. Fl. =	16	1
$16\frac{4}{5}$ E. E. =	21	0
Ans.	56	0

(9)

	bu.	pk.	qt.
$22\frac{1}{4}$ bu. =	22	1	0
$19\frac{5}{12}$ bu. =	19	1	$5\frac{1}{3}$
$33\frac{5}{9}$ bu. =	33	2	$1\frac{7}{9}$
Ans.	75	0	$7\frac{1}{9}$

(10)

	mi.	fur.	rd.	yd.	ft.	in.
$28\frac{3}{7}$ mi. =	28	3	17	0	2	$4\frac{2}{7}$
$33\frac{1}{14}$ mi. =	33	0	22	4	2	$1\frac{5}{7}$
$29\frac{1}{21}$ mi. =	29	0	15	1	0	$11\frac{1}{7}$
Ans.	90	4	15	$\frac{1}{2}$	2	$5\frac{1}{7}$, or
	90	4	15	1	0	$11\frac{1}{7}$

(11)

	yd.	qr.	na.
$\frac{\cancel{1}}{\cancel{2}}$ of $\frac{3}{1}$ of $\frac{\cancel{6}}{\cancel{2}}$ of $\frac{\cancel{2}}{\cancel{6}}$ yd. = $\frac{3}{2}$ yd. =	1	2	0
$\frac{\cancel{1}}{\cancel{4}}$ of $\frac{\cancel{4}}{\cancel{5}}$ of $\frac{\cancel{5}}{1}$ yd. = 1 yd. =	1	0	0
$\frac{1}{6}$ of $\frac{\cancel{3}}{2}$ of $\frac{1}{\cancel{3}}$ yd. = $\frac{1}{12}$ yd. =	0	0	$1\frac{1}{3}$
Ans.	2	2	$1\frac{1}{3}$

(12)

	cwt.	qr.	lb.	oz.	dr.
$1\frac{1}{7}$ cwt. =	1	0	14	4	$9\frac{1}{7}$
$17\frac{2}{3}$ lb. =	0	0	17	10	$10\frac{2}{3}$
$7\frac{4}{5}$ oz. =	0	0	0	7	$12\frac{4}{5}$
Ans.	1	1	7	7	$0\frac{64}{105}$

SUBTRACTION.

(9)

mi.	fur.	rd.	yd.	ft.		mi.	fur.	rd.	yd.	ft.	
84	7	13	2	1	=	84	7	13	2	$0\frac{4}{4}$	
69	7	25	4	$2\frac{3}{4}$	=	69	7	25	4	$2\frac{3}{4}$	
					Ans.	14	7	27	$2\frac{1}{2}$	$1\frac{1}{4}$,	or
						14	7	27	2	2	9 in.

	yd.	ft.	in.
$2\frac{1}{2}$ yd. =	2	1	6
$1\frac{1}{4}$ ft. =	0	1	3
	2	2	9

(10)

A.	R.	P.	sq. yd.	sq. ft.		A.	R.	P.	sq. yd.	sq. ft.	
145	3	35	19	$6\frac{1}{3}$	=	145	3	35	19	$5\frac{12}{9}$	
98	3	39	25	$8\frac{7}{9}$	=	98	3	39	25	$8\frac{7}{9}$	
					Ans.	46	3	35	$23\frac{1}{4}$	$6\frac{5}{9}$,	or
						46	3	35	23	$8\frac{29}{36}$	

(13)

mo.	wk.	da.	hr.	min.
38	2	3	7	10
10	3	2	10	50
27	3	0	20	20

(14)

yr.	mo.	wk.	da.
176	8	4	4
91	9	2	6
84	11	1	5

(15)

£	s.
3	0
0	3
2	17

(16)

lb.	oz.	pwt.	gr.
2	0	0	0
0	0	0	20
1	11	19	4

(17)

℔	℥	ʒ	℈
8	0	0	0
1	1	2	2
6	10	5	1

(18)

T.	cwt.	qr.	lb.	oz.	dr.
9	0	0	0	0	0
1	1	2	20	15	14
7	18	1	4	0	2

(19)

mi.	fur.	rd.
3	0	0
0	3	19
2	4	21

(20)

lb.	oz.	pwt.	gr.
167	8	16	10
98	10	12	19
68	10	3	15

(21)

T.	cwt.	qr.	lb.	oz.	dr.
19	11	2	2	12	12
17	13	2	19	14	10
1	17	3	7	14	2

(22)

℔	℥	ʒ	℈	gr.
101	11	7	2	19
17	2	3	1	5
84	9	4	1	14

(23)

yd.	qr.	na.	in.
46	1	3	0
42	3	1	2
3	2	1	0¼

(24)

C.	cu. ft.
7	0
2	78
4	50

or 4C. 3c. ft. 2cu. ft.

TIME BETWEEN DATES.

(2)

yr.	mo.	da.
1856	7	4
1847	3	2
9	4	2

(3)

yr.	mo.	da.
1856	2	3
1834	4	28
21	9	5

(4)

yr.	mo.	da.
1854	1	2
1836	11	29
17	1	3

(6)

yr.	mo.	da.	hr.
1853	2	6	21
1840	10	9	23
12	3	26	22

(7)

yr.	mo.	da.	hr.
1801	11	5	21
1771	9	6	9
30	1	29	12

(8)

yr.	mo.	da.
1783	1	20
1775	4	19
7	9	1

(9)

yr.	mo.	da.
1862	7	25
1492	10	11
369	9	14

SUBTRACTION OF FRACTIONS.

(1)

	pwt.	gr.
$\frac{3}{8}$ oz. =	7	12
$\frac{7}{8}$ pwt. =	0	21
Ans.	6	15

(2)

	£	s.	d.
$1\frac{1}{2}$ £ =	1	10	0
$\frac{3}{4}$ s. =	0	0	9
Ans.	1	9	3

(3)

	oz.	pwt.	gr.
$1\frac{1}{5}$ oz. =	1	4	0
$\frac{7}{8}$ pwt. =	0	0	21
Ans.	1	3	3

(4)

	hr.	min.	sec.
$\frac{1}{2}$ da. =	12	0	0
$\frac{2}{3}$ sec. =	0	0	$0\frac{2}{3}$
Ans.	11	59	$59\frac{1}{3}$

(5)

	yd.	ft.	in.
$\frac{2}{3}$ rd. =	3	2	0
$\frac{3}{7}$ in. =	0	0	$0\frac{3}{7}$
Ans.	3	1	$11\frac{4}{7}$

(6)

	gal.	qt.	pt.	gill.
$\frac{4}{15}$ hhd. =	16	3	0	$1\frac{3}{5}$
$\frac{6}{7}$ qt. =	0	0	1	$2\frac{6}{7}$
Ans.	16	2	0	$2\frac{26}{35}$

(7)

	pwt.	gr.
$\frac{3}{5}$ oz. =	12	0
$\frac{7}{8}$ pwt. =	0	21
Ans.	11	3

(8)

	cwt.	qr.	lb.	oz.	dr.
$4\frac{3}{7}$ cwt. =	4	1	17	13	$11\frac{3}{7}$
$4\frac{9}{10}$ lb. =	0	0	4	14	$6\frac{4}{10}$
Ans.	4	1	12	15	$5\frac{1}{35}$

(9)

		cwt.	qr.	lb.	oz.	dr.
$8\frac{6}{7}$ cwt.	=	8	3	10	11	$6\frac{6}{7}$
$4\frac{9}{10}$ lb.	=	0	0	4	14	$6\frac{4}{10}$
	Ans.	8	3	5	13	$0\frac{16}{35}$

(10)

		lb.	oz.	pwt.	gr.
$3\frac{1}{2}$ lb.	=	3	6	0	0
$\frac{1}{6}$ oz.	=	0	0	3	8
	Ans.	3	5	16	16

(11)

		rd.	yd.	ft.	in.
$1\frac{1}{3}$ rod	=	1	1	2	6
$\frac{3}{7}$ in.	=	0	0	0	$0\frac{3}{7}$
	Ans.	1	1	2	$5\frac{4}{7}$

(12)

		℥	ʒ	℈	gr.
$\frac{49}{72}$ lb.	=	8	1	1	0
$\frac{7}{16}$ ℥	=	0	3	1	10
	Ans.	7	5	2	10

(13)

		hhd.	gal.	qt.	pt.	gill.
.69875 tun	=	2	50	0	0	2.72
.386125 hhd.	=	0	24	1	0	2.428
	Ans.	2	25	3	0	0.292

(14)

		wk.	da.	hr.	min.	sec.
2.9675 wk.	=	2	6	18	32	24
5.96974 da.	=	0	5	23	16	25.536
	Ans.	2	0	19	15	58.464

(15)

		qr.	lb.
$\frac{6}{7}$ cwt.	=	3	10.71428
.2125 qr.	=	0	5.3125
		3	5.40178

3 qr. 5.40178 lb. = 80.40178 lb.

80.40178 × 06 = $4.8241065+, *Ans.*

MULTIPLICATION.

(8)

bu.	pk.	qt.
2	1	3
		11
25	3	1

(9)

C.	c. ft.
1	2
	7
8	6

yr.	mo.	da.
1831	3	12
1825	5	21
5	9	21

(10)

yr.	mo.	da.
5	9	21
		3
17	5	3

(11)

lb.	oz.	pwt.
	3	6
		12
3	3	12

(12)

T.	cwt.	qr.	lb.
	5	2	16
			7
1	19	2	12

(13)

℔	℥	ʒ	℈	gr.
3	4	6	1	16
				4
13	7	2	1	4

(14)

mi.	fur.	rd.
24	4	4¾
		5
122	4	23¾

(15)

A.	R.	P.
12	1	25
		9
111	2	25

(16)

yd.	qr.	na.
29	2	3
		9
267	0	3

(17)

L.	mi.	fur.	rd.
5	2	6	36
			8
47	1	7	8

(18)

hhd.	gal.	qt.	pt.	gi.
	62	1	1	1
				96
95	6	0	0	0

(19)

lb.	oz.	pwt.	gr.
	3	5	15
			10
2	8	16	6
			12
32	9	15	0

(20)

mi.	fur.	rd.
24	7	4
		5
124	3	20
		6
746	5	0

(21)

°	′
0	15
	10
2	30
	6
15	0

(22)

T.	cwt.	qr.	lb.
	12	2	11
			10
	126	0	10
			9
56	14	3	15

(23)

£	s.	d.
	5	$9\frac{1}{2}$
		18
5	4	3

(24)

hhd.	gal.	qt.	pt.
	61	1	1
			25
24	22	1	1

(25)

yd.	qr.
25	3
	36
927	0

DIVISION.

(5)

	cwt.	qr.	lb.	oz.
7)	17	0	2	6
	2	1	18	$3\frac{1}{7}$

(6)

	yd.	qr.	na.
9)	49	3	3
	5	2	$0\frac{7}{9}$

(7)

	lb.	oz.
8)	201	12
	25	$3\frac{1}{2}$

(8)

	°	′	″
10)	25	42	40
	2	34	16

(9)

	hhd.	gal.	qt.	pt.
12)	9	28	2	0
		49	2	1

(10)

	bu.	pk.	qt.
12)	65	1	3
	5	1	$6\frac{1}{4}$

(11)

	℔	℥	ʒ	℈	gr.
4)	13	7	2	1	4
	3	4	6	1	16

(12)

	A.	R.	P.
9)	113	3	25
	12	2	25

(13)

	T.	cwt.
15)	35	5
	2	7

(14)

	gal.	qt.	pt.
25)	1534	1	1
	61	1	1

(15)

	£	s.	d.
65)	72	14	$4\frac{1}{2}$
	1	2	$4\frac{1}{2}$

(16)

	£	s.	d.
53)	1138	12	4
	21	9	8

(17)

	bu.	pk.	qt.	pt.	gi.
84)	27	0	7	0	0
		1	2	0	$2.952\frac{8}{21}$

(18)

	T.	cwt.	qr.	lb.	oz.	dr.
79)	70	17	0	7	0	0
		17	3	18	12	$2\frac{34}{79}$

(19)

	hhd.	gal.	qt.	pt.
40)	114	56	1	0
	2	54	3	1.65

(20)

	mi.	fur.	rd.
30)	746	5	0
	24	7	4

(21)

	lb.	oz.	pwt.	gr.
7)	98	2	19	5
	14	0	8	11

(22)

	gal.	qt.
52)	175	2
	3	1.5

APPLICATIONS IN THE FOREGOING RULES.

(1)

41 A. 2 R. 11 P. × 18 = 748 A. 0 R. 38 P., whole land.
748 A. 0 R. 38 P. ÷ 7 = 106 A. 3 R. $22\frac{4}{7}$ P., child's share.

(2)

	bu.	pk.	qt.
35)	168	1	6
	4	3	2, *Ans.*

(3)

20 yr. 5 mo. 3 wk. 6 da. × 14 = 286 yr. 11 mo. 2 wk.
286 yr. 11 mo. 2 wk. ÷ 3 = 95 yr. 7 mo. 3 wk. 2 da. 8 hr

(4)

7 T. 16 cwt. 3 qr. 12 lb. ÷ 63 = 2 cwt. 1 qr. 24 lb., *Ans.*

(5)

13 cwt. 2 qr. 15 lb. 6 oz. ÷ 176 = 7 lb. $12\frac{1}{8}$ oz.
7 lb. 12.125 oz. ÷ 7 = 1 lb. 1.73214 + oz., *Ans.*

(6)

15° ÷ 60 = 0° 15′, *Ans.*

(7)

232 bu. 3 pk. 7 qt. ÷ 105 = 2 bu. 0 pk. 7 qt., *Ans.*

(8)

44 hhd. 53 gal. 2 qt. 1 pt. ÷ 59 = 47 gal. 3 qt. 1.13559 pt.
47 gal. 3 qt. 1.13559 pt. ÷ 5 = 9 gal. 2 qt. 0.62711 pt.+

(9)

12 cwt. 2 qr. 14 lb. × 90 = 1137 cwt. 2 qr. 10 lb. = 113760 lb.
113760 lb. × $.06\frac{1}{4}$ = $7110, *Ans.*

(10)

	T.	cwt.	qr.	lb.
90)	56	14	3	15
		12	2	11, *Ans.*

(11)

49 mi. 6 fur. 8 rd. × 30 = 1493 mi. 2 fur.
1493 mi. 2 fur. ÷ 12 = 124 mi. 3 fur. 20 rd., *Ans.*

(12)

£18 6s. 9d. = 4401d.; £4 9s. 3d. = 1071d.
4401 ÷ 1071 = $4\frac{13}{119}$, *Ans.*

(13)

211 mi. 4 fur. 32 rd. × 15 = 3174 mi.

3500 − 3174 = 326 mi., *Ans.*

(14)

336 × 500 = 168000 pages in 500 copies;

168000 ÷ 16 = 10500 number sheets in copies;

10500 ÷ 24 = 437 quires 12 sheets;

437 ÷ 18 = 24 reams 5 quires 12 sheets, *Ans.*

For 20 quires, less 2 quires of waste paper = 18 quires.

(15)

1 T. 5 cwt. 2 qr. 20 lb. = 2570 lb

2 cwt. 1 qr. 15 lb. = 240 lb.

2570 ÷ 240 = $10\frac{17}{24}$ bbls., *Ans.*

(16)

(£5 8s.) × 4 + £50 = £71 12s.;

£135 6s. 8d. − £71 12s. = £63 14s. 8d., *Ans.*

(17)

200 mi. 6 fur. 18 rd. ÷ 24 mi. 7 fur. 30 rd. =

64248 rd. ÷ 7990 rd. = $8\frac{169}{3995}$ da., *Ans.*

(18)

1 pt. 3 gi. × 12 = 2 gal. 2 qt. 1 pt.; 5 gal. × 6 = 30 gal.;

1 qt. 0 pt. 2 gi. × 36 = 11 gal. 1 qt.;

2 gal. 2 qt. 1 pt. + 30 gal. + 11 gal. 1 qt. = 43 gal. 3 qt. 1 pt.;

1 pi. − 43 gal. 3 qt. 1 pt. = 1 hhd. 19 gal. 0 qt. 1 pt., *Ans.*

(19)

£275 10s. 6d. ÷ £1 4s. 9d. = 66126d. ÷ 297d. = $222\frac{64}{99}$ bbl.

(20)

246 mi. 6 fur. 36 rd. ÷ 12 = 20 mi. 4 fur. 23 rd., dist. 1 day.
20 mi. 4 fur. 23 rd. × 9 = 185 mi. 1 fur. 7 rd., dist. 9 days.
246 mi. 6 fur. 36 rd. − 185 mi. 1 fur. 7 rd. = 61 mi. 5 fur. 29 rd

(21)

1 T. 5 cwt. 3 qr. × 50 = 64 T. 7 cwt. 2 qr.;
18 cwt. 2 qr. 12 lb. × 40 = 37 T. 4 cwt. 3 qr. 5 lb.;
15 cwt. 3 qr. 18 lb. × 75 = 59 T. 14 cwt. 3 qr.;
64 T. 7 cwt. 2 qr. + 37 T. 4 cwt. 3 qr. 5 lb. + 59 T. 14 cwt. 3 qr.
= 161 T. 7 cwt. 0 qr. 5 lb.;
161 T. 7 cwt. 0 qr. 5 lb. ÷ 8 = 20 T. 3 cwt. 1 qr. 13.125 lb.

(22)

12 cwt. 2 qr. 15 lb. × 60 = 759 cwt. = 75900 lb.;
75900 × .25 = $18975 ; 18975 ÷ 5 = $3795, loss of each ;
250 − 60 = 190 bales ; 190 ÷ 5 = 38 bales ;
12 cwt. 2 qr. 15 lb. × 38 = 24 T. 0 cwt. 2 qr. 20 lb., *Ans.*

(23)

5 yd. 3 qr. 2 na. × 48 = 282 yd.; 282 ÷ 35 = $8\frac{2}{35}$ pieces.

(24)

34 yd. 3 qr. × 3 = 104 yd. 1 qr.;
37 yd. 1 qr. 3 na. × 6 = 224 yd. 2 qr. 2 na.;
40 yd. 2 qr. 2 na. × 6 = 243 yd. 3 qr.;
104 yd. 1 qr. + 224 yd. 2 qr. 2 na. + 243 yd. 3 qr. =
572 yd. 2 qr. 2 na.;
572 yd. 2 qr. 2 na. − 2 yd. 3 qr. = 569 yd. 3 qr. 2 na.;
569 yd. 3 qr. 2 na. ÷ 6 yd. 1 qr. 3 na. = 9118 ÷ 103 = $88\frac{54}{103}$.

LONGITUDE AND TIME.

(2)

75° 10′
74 1
15) 1° 9′ 0″
4 m. 36 s.

hr.	min.	sec.	
12	0	0	
	4	36	
11	55	24,	*Ans.*

(3)

84° 24′
74 1
15) 10° 23′ 0″
41 m. 32 s.

hr.	min.	sec.	
12	0	0	
	41	32	
11	18	28,	*Ans.*

(4)

89° 2′
74 1
15) 15° 1′
1 h. 0 m. 4 s.

hr.	min.	sec.	
12	0	0	
1	0	4	
10	59	56,	*Ans.*

(5)

90° 15′ 10″
74 1 0
15) 16° 14′ 10″
1 h. 4 m. 56⅔ s.

	hr.	min.	sec.	
	15	25	0	
	1	4	56⅔	
	14	20	3⅓	
or	2	20	3⅓	P. M., *Ans.*

(6)

89° 2′
71 4
15) 17° 58′
1 h. 11 m. 52 s.

hr.	min.	sec.	
7	12	0	
1	11	52	
6	0	8	A. M., *Ans.*

(7)

$$\begin{array}{rrrr} & 87^\circ & 30' & \\ & 74 & 1 & \\ \hline 15) & 13^\circ & 29' & 0'' \\ \hline & & 53\text{m.} & 56\text{s.} \end{array}$$

$$\begin{array}{rrrl} \text{hr.} & \text{min.} & \text{sec.} & \\ 12 & 0 & 0 & \\ & 53 & 56 & \\ \hline 12 & 53 & 56, & \textit{Ans.} \end{array}$$

(2)

$$\begin{array}{rrr} \text{hr.} & \text{min.} & \text{sec.} \\ 10 & 21 & 56 \\ 10 & 0 & 0 \\ \hline & 21 & 56 \\ & & 15 \\ \hline 5^\circ & 29' & 0'' \end{array}$$

$$\begin{array}{rrl} 84^\circ & 21' & \\ 5 & 29 & \\ \hline 78^\circ & 52' & \text{W., } \textit{Ans.} \end{array}$$

(3)

$$\begin{array}{rrr} \text{hr.} & \text{min.} & \text{sec.} \\ 17 & 6 & 28 \\ 12 & 0 & 0 \\ \hline 5 & 6 & 28 \\ & & 15 \\ \hline 76^\circ & 37' & 0'' \end{array}$$

$$\begin{array}{rrrl} 0^\circ & 0' & 0'' & \\ 76 & 37 & 0 & \\ \hline 76^\circ & 37' & 0'' & \text{W., } \textit{Ans.} \end{array}$$

(4)

$$\begin{array}{rrr} \text{hr.} & \text{min.} & \text{sec.} \\ 16 & 56 & 4\frac{2}{15} \\ 12 & 0 & 0 \\ \hline 4 & 56 & 4\frac{2}{15} \\ & & 15 \\ \hline 74^\circ & 1' & 2'' \end{array}$$

$$\begin{array}{rrrl} 0^\circ & 0' & 0'' & \\ 74 & 1 & 2 & \\ \hline 74^\circ & 1' & 2'' & \text{W., } \textit{Ans.} \end{array}$$

(5)

$$\begin{array}{rrr} \text{hr.} & \text{min.} & \text{sec.} \\ 14 & 15 & 30 \\ 12 & 0 & 0 \\ \hline 2 & 15 & 30 \\ & & 15 \\ \hline 33^\circ & 52' & 30'' \end{array}$$

$$\begin{array}{rrrl} 0^\circ & 0' & 0'' & \\ 33 & 52 & 30 & \\ \hline 33^\circ & 52' & 30'' & \text{W., } \textit{Ans.} \end{array}$$

DUODECIMALS.

ADDITION AND SUBTRACTION.

(1)

$185' \div 12 = 15 \text{ ft. } 5'$, *Ans.*

(2)

$250'' \div 12 = 20'\ 10''$; $20' \div 12 = 1 \text{ ft. } 8'$.

$1 \text{ ft. } 8'\ 10''$, *Ans.*

(3)

$4367''' \div 12 = 363''\ 11'''$; $363'' \div 12 = 30'\ 3''$;

$30' \div 12 = 2 \text{ ft. } 6'$. $2 \text{ ft. } 6'\ 3''\ 11'''$, *Ans.*

(4)

$$\begin{array}{llll} 3 \text{ ft.} & 6' & 3'' & 2''' \\ 2 & 1 & 10 & 11 \\ \hline 5 \text{ ft.} & 8' & 2'' & 1''' \end{array}$$

(5)

$$\begin{array}{llll} 8 \text{ ft.} & 9' & 7'' & 0''' \\ 6 & 7 & 3 & 4 \\ \hline 15 \text{ ft.} & 4' & 10'' & 4''' \end{array}$$

(6)

$$\begin{array}{llll} 9 \text{ ft.} & 3' & 5'' & 6''' \\ 7 & 3 & 6 & 7 \\ \hline 1 \text{ ft.} & 11' & 10'' & 11''' \end{array}$$

(7)

$$\begin{array}{llll} 40 \text{ ft.} & 6' & 6'' & 0''' \\ 29 & 0 & 0 & 7 \\ \hline 11 \text{ ft.} & 6' & 5'' & 5''' \end{array}$$

(8)

$$\begin{array}{llll} 12 \text{ ft.} & 7' & 9'' & 6''' \\ 4 & 9 & 7 & 9 \\ \hline 7 \text{ ft.} & 10' & 1'' & 9''' \end{array}$$

(9)

$6'\ 8'' = 80''$

$1 \text{ ft.} = 144''$

$\frac{80}{144} = \frac{5}{9}$ ft., *Ans*

(10)

$9'\ 10''\ 8''' = 1424'''$

$1 \text{ ft.} = 1728'''$

$\frac{\cancel{1424}}{\cancel{1728}} = \frac{89}{108}$ ft., *Ans.*

(11)

$4'\ 5''\ 3''' = .36979\ +$, *Ans.*

(12)

$$\left.\begin{array}{lcl} 7''\ 6''' & = & 90''' \\ 1 \text{ ft.} & = & 1728''' \end{array}\right\} \tfrac{90}{1728} = .052083\tfrac{1}{3} \text{ ft., } \textit{Ans.}$$

MULTIPLICATION OF DUODECIMALS.

(1)

$$\begin{array}{rrrl} 9 \text{ ft.} & 4' & & \\ 8 \text{ ft.} & 3' & & \\ \hline 2 \text{ ft.} & 4' & 0'' & = 9 \text{ ft. } 4' \times 3' \\ 74 \text{ ft.} & 8' & 0'' & = 9 \text{ ft. } 4' \times 8 \text{ ft.} \\ \hline 77 \text{ ft.} & 0' & 0'', & \textit{Ans.} \end{array}$$

(2)

$24 \times 4 \times 3$ ft. 6 in. = cu. meas.

$$\begin{array}{rr} 3 \text{ ft.} & 6 \text{ in.} \\ 4 \text{ ft.} & \\ \hline 14 \text{ ft.} & 0' \\ 24 & \\ \hline 336 \text{ cu. ft.} & 0' \end{array}$$

$336 \div 128 = 2$ C. 80 cu. ft.
$80 \div 16 = 5$ c. ft.
2 C. 5 c. ft., *Ans.*

(3)

9 ft. 2 in. × 9 ft. 6 in. = 87 sq. ft. 1′, *Ans.*

(4)

17 ft. 6 in. × 1 ft. 7 in. = $27\frac{51}{72}$ sq. ft., *Ans.*

(5)

24 ft. 10′ × 6 ft. 8′ = 165 sq. ft. 6′ 8″, *Ans.*

(6)

3 ft. 9 in. × 2 ft. 3 in. × 12 ft. 6 in. = $105\frac{15}{32}$ cu. ft., *Ans.*

(7)

70 ft. 9 in. × 12 ft. 3 in. = $866\frac{11}{16}$ sq. ft., *Ans.*

(8)

24 ft. × 16 ft. 9 in. × 12 ft. 6 in. = 5025 cu. ft. in pile.

5025 ÷ 128 = 39 C. 33 cu. ft., *Ans.*

(9)

$$\begin{array}{lrrrl} & \text{sq. ft.} & ' & '' & \\ 14\text{ ft. }8' \times 7\text{ ft. }11' = & 116 & 1 & 4 & = \text{sq. meas. of 1 long side.} \\ 11\text{ ft. }6' \times 7\text{ ft. }11' = & 91 & 0 & 6 & = \text{sq. meas. of 1 short side.} \\ \hline & 207 & 1 & 10 & \times 2 = 414\text{ sq. ft. }3'\ 8'' = \\ & & & & \text{sq. meas. of 4 walls.} \end{array}$$

414 sq. ft. 3′ 8″ ÷ 9 = 46 sq. yd. 0 sq. ft. 3′ 8″ = $46\frac{11}{324}$ sq. yd.

(10)

8 ft. × 3 ft. 9 in. × 6 ft. 6 in. = 195 cu. ft.;

195 ÷ 128 = 1 C. 67 cu. ft. = 1 C. 4 c. ft. 3 cu. ft., *Ans.*

(11)

42 ft. 10′ × 12 ft. 6′ × 8 ft. = 4283 cu. ft. 4′;

4283 cu. ft. 4′ ÷ 27 = 158 cu. yd. $17\frac{1}{3}$ cu. ft., *Ans.*

(12)

$$\begin{array}{lr} 20\text{ ft. }6' \times 9\text{ ft. }6' = & 194\text{ sq. ft. }9' \\ 16\text{ ft.}\quad \times 9\text{ ft. }6' = & 152\text{ sq. ft. }0' \\ \hline & 346\text{ sq. ft. }9' \\ & 2 \\ \hline & 693\text{ sq. ft. }6' \end{array}$$

20 ft. 6′ × 16 ft. = 328 sq. ft. = ceiling.

693 sq. ft. 6′ + 328 sq. ft. = 1021 sq. ft. 6′.

6 ft. 6′ × 3 ft. 3′ = 21 sq. ft. 1′ 6″ = door.

1021 sq. ft. 6′ — 21 sq. ft. 1′ 6″ = 1000 sq. ft. 4′ 6″.

1000 sq. ft. 4′ 6″ ÷ 9 = $111\frac{11}{72}$ sq. yd.

$111\frac{11}{72}$ × .18 = $20.00¾, *Ans.*

(13)

Since the boards are to be an inch thick, there will be cut 3 boards, whose united length will be 3 times 18 ft. 9 in. = 56 ft. 3 in.

56 ft. 3 in. × 1 ft. 6 in. = 84 sq. ft. 4′ 6″, *Ans.*

(14)

45 ft. 6′ × 1 ft. 6′ × 37 ft. 9′ = 2576 cu. ft. 5′ 3″ = 95.4236 cu. yd.;

$3.91¼ × 95.4236 = $373.34483+, *Ans.*

(15)

45 ft. 6′ × 25 ft. × 10 ft. 9′ = 12228 cu. ft. 1′ 6″ = $452\frac{193}{216}$ cu. yd.;

$452\frac{193}{216}$ × 2 = $905\frac{85}{108}$ loads, *Ans.*

RATIO AND PROPORTION.

(1)

3 : 6 = $\frac{6}{3}$ = 2, *Ans.*

(2)

10 : 40 = $\frac{40}{10}$ = 4, *Ans.*

(3)

9 : 18 = $\frac{18}{9}$ = 2, *Ans.*

(4)

$$3 \times 9 : 9 \times 9 = \frac{\overset{3}{\cancel{9}} \times \cancel{9}}{\underset{1}{\cancel{3}} \times \cancel{9}} = 3, \text{ Ans.}$$

(5)

$$3 \times 4 : 12 \times 12 = \frac{12 \times \overset{3}{\cancel{12}}}{\cancel{3} \times \cancel{4}} = 12, \text{ Ans.}$$

(6)

$$5 \times 3 \times 2 : 6 \times 10 \times 3 = \frac{6 \times \overset{2}{\cancel{10}} \times \cancel{3}}{\cancel{5} \times \cancel{3} \times \cancel{2}} = 6, \text{ Ans.}$$

(7)

$9 : 2 = \frac{2}{9}$, *Ans.*

(8)

$16 : 4 = \frac{4}{16} = \frac{1}{4}$, *Ans.*

(9)

$100 : 20 = \frac{20}{100} = \frac{1}{5}$, *Ans.*

(10)

$300 : 200 = \frac{2}{3}$, *Ans.*

(11)

$144 : 36 = \frac{36}{144} = \frac{1}{4}$, *Ans.*

(12)

$12 : 3 = \frac{3}{12} = \frac{1}{4}$, *Ans*

(13)

$20 : 5 = \frac{1}{4}$, *Ans.*

(14)

$56 : 8 = \frac{8}{56} = \frac{1}{7}$, *Ans.*

(15)

$8 : 7 = \frac{7}{8}$, *Ans.*

(16)

$132 : 12 = \frac{12}{132} = \frac{1}{11}$, *Ans*

(17)

$\frac{5}{6} : \frac{1}{4} = \frac{\frac{1}{4}}{\frac{5}{6}} = \frac{6}{20} = \frac{3}{10}$, *Ans.*

(18)

$\frac{9}{11} : \frac{1}{2} \text{ of } \frac{3}{7} = \frac{\frac{3}{14}}{\frac{9}{11}} = \frac{11}{42}$, *Ans.*

(19)

$9\frac{1}{5} : 4\frac{1}{3} = \frac{65}{138}$, *Ans.*

(20)

$4\frac{1}{5} : \frac{3}{7} = \frac{\frac{3}{7}}{\frac{21}{5}} = \frac{15}{147} = \frac{5}{49}$, *Ans.*

(21)

$6.975 : 2.75 = \frac{2.750}{6.975} = \frac{110}{279}$, *Ans.*

(22)

$7.1875 : 5.125 = \frac{5.1250}{7.1875} = \frac{82}{115}$, *Ans.*

(23)

2 T. 3 cwt. 2 qr. : 1 T. 11 cwt. 3 qr. 16 lb. $= \frac{3191 \text{ lb.}}{4350 \text{ lb.}}$ *Ans.*

(24)

1 mi. 6 fur. 8 rd. : 10 mi. 1 fur. 16 rd. 1 yd. 2 ft. $= 5\frac{6869}{9372}$, *Ans.*

(26)

$12 \times 6 = 72$, *Ans.*

(27)

$108 \div 9 = 12$, *Ans.*

(28)

$125 \div 5 = 25$, *Ans.*

(29)

$\frac{1}{\cancel{3}} \times \frac{\cancel{3}}{5} = \frac{1}{5}$, *Ans*

(30)

$\frac{4}{9} \div \frac{5}{7} = \frac{28}{45}$, *Ans.*

(31)

$12 \div 6 = 2$, *Ans.*

(32)

$\frac{1}{3} \div \frac{1}{2} = \frac{2}{3}$, *Ans.*

(33)

$\frac{1 \times 5 \times 4 \times \cancel{2}}{3 \times \underset{3}{\cancel{6}} \times 9} = \frac{20}{81}$, *Ans.*

SIMPLE PROPORTION.

(2)

$$\frac{\overset{3}{\cancel{45}} \times 9}{\cancel{15}} = 27 = x.$$

(3)

$$\frac{8 \times \overset{5}{\cancel{50}}}{\cancel{10}} = 40 = x.$$

(4)

$$\frac{\cancel{9} \times \overset{5}{\cancel{30}}}{\cancel{54}} = 5 = x.$$

(5)

$$\frac{\overset{5}{\cancel{15}} \times 4}{\cancel{3}} = 20 = x.$$

(6)

$$\tfrac{5}{12} \times \tfrac{1}{7} \div \tfrac{4}{9} = \tfrac{15}{112} = x.$$

(7)

$$2 : 4 :: 5 : x; \quad \frac{5 \times \overset{2}{\cancel{4}}}{\cancel{2}} = 10 = x.$$

(8)

$$3 : 21 :: \tfrac{1}{2} : x; \quad \frac{\overset{7}{\cancel{21}} \times \frac{1}{2}}{\cancel{3}} = 3\tfrac{1}{2} = x.$$

(9)

$$6 : 18 :: 5 : x; \quad \frac{\overset{3}{\cancel{18}} \times 5}{\cancel{6}} = 15 = x.$$

RULE OF THREE.

(1)

$$\overset{\text{da.}}{3} : \overset{\text{da.}}{11} :: \overset{\text{mi.}}{84} : \overset{\text{mi.}}{x} = 308 \text{ mi.} \qquad \frac{11 \times \overset{28}{\cancel{84}}}{\cancel{3}} = 308. \ \textit{Ans.}$$

(2)

$\overset{\text{hat}}{4} : \overset{\text{hat}}{55} :: \overset{\$}{12} : \overset{\$}{x} = \$165.$ $\qquad \frac{55 \times \overset{3}{\cancel{12}}}{\cancel{4}} = 165,$ *Ans.*

(3)

$\overset{\text{pers.}}{8} : \overset{\text{pers.}}{12} :: \overset{\text{day}}{48} : \overset{\text{day}}{x} = 72 \text{ da.}$ $\qquad \frac{12 \times \overset{6}{\cancel{48}}}{\cancel{8}} = 72,$ *Ans.*

(4)

$\overset{\text{yd.}}{40} : \overset{\text{yd.}}{325} :: \overset{\$}{170} : \overset{\$}{x} = \$1381.25.$

$$\frac{325 \times \overset{17}{\cancel{170}}}{\underset{4}{\cancel{40}}} = \frac{5525}{4} = 1381.25, \text{ Ans.}$$

(5)

$\overset{\text{sheep}}{240} : \overset{\text{sheep}}{1200} :: \overset{\text{lb.}}{660} : \overset{\text{lb.}}{x} = 3000 \text{ lb.}$

$$\frac{\overset{300}{\cancel{1200}} \times \overset{11}{\cancel{660}}}{\underset{4}{\cancel{240}}} = 3300. \text{ Ans.}$$

(6)

$\overset{\text{men.}}{25} : \overset{\text{men.}}{100} :: \overset{\text{da.}}{40} : \overset{\text{da.}}{x} = 160 \text{ da.}$ $\qquad \frac{\overset{4}{\cancel{100}} \times 40}{\cancel{25}} = 160,$ *Ans.*

(7)

$\overset{\text{gal.}}{2} : \overset{\text{gal.}}{189} :: \overset{\$}{.65} : \overset{\$}{x} = \$61.42\frac{1}{2}.$

$$\frac{189 \times .65}{2} = \frac{122.85}{2} = 61.425, \text{ Ans.}$$

(8)

$$\overset{\text{da.}}{6} : \overset{\text{da.}}{313} :: \overset{\text{mi.}}{210} : \overset{\text{mi.}}{x} = 10955 \text{ mi.} \qquad 365 - 52 = 313.$$

$$\frac{313 \times \overset{35}{\cancel{210}}}{\cancel{6}} = 10955, \textit{ Ans.}$$

(9)

$$\overset{\text{da.}}{12} : \overset{\text{da.}}{6} :: \overset{\text{horse}}{40} : \overset{\text{horse}}{x} = 20 \text{ horses.} \qquad \frac{\cancel{6} \times \overset{20}{\cancel{40}}}{\underset{\cancel{2}}{\cancel{12}}} = 20, \textit{ Ans.}$$

(10)

$$\overset{\text{yd.}}{4} : \overset{\text{yd.}}{75} :: \overset{\$}{13} : \overset{\$}{x} = \$243.75.$$

$$\frac{75 \times 13}{4} = \frac{975}{4} = 243.75, \textit{ Ans.}$$

(11)

$$\overset{\text{yd.}}{48} : \overset{\text{yd.}}{144} :: \overset{\$}{67.25} : \overset{\$}{x} = \$201.75.$$

$$\frac{\overset{3}{\cancel{144}} \times 67.25}{\cancel{48}} = 201.75, \textit{ Ans.}$$

(12)

$$\overset{\text{paces}}{3} : \overset{\text{paces}}{160} :: \overset{\text{yd.}}{2} : \overset{\text{yd.}}{x} = 106\tfrac{2}{3} \text{ yd.} \qquad \frac{160 \times 2}{3} = 106\tfrac{2}{3}, \textit{ Ans.}$$

(13)

$$\overset{\text{men}}{750} : \overset{\text{men}}{1200} :: \overset{\text{rat.}}{22500} : \overset{\text{rat.}}{x} = 36000 \text{ rations.}$$

$$\frac{\overset{30}{\cancel{22500}} \times 1200}{\cancel{750}} = 36000, \textit{ Ans.}$$

(14)

$$\overset{\text{hr.}}{6} : \overset{\text{hr.}}{4} :: \overset{\text{da.}}{12} : \overset{\text{da.}}{x} = 8 \text{ da.} \qquad \frac{4 \times \overset{2}{\cancel{12}}}{\cancel{6}} = 8, \textit{ Ans.}$$

(15)

$$\overset{\text{hor.}}{20} : \overset{\text{hor.}}{30} :: \overset{\text{da.}}{18} : \overset{\text{da.}}{x} = 27 \text{ da.} \qquad \frac{\overset{3}{\cancel{30}} \times \overset{9}{\cancel{18}}}{\underset{\cancel{10}}{\cancel{20}}} = 27, \textit{ Ans.}$$

(17)

$$\overset{\text{lbs.}}{2} : \overset{\text{lbs.}}{30} :: \overset{\$}{\tfrac{1}{8}} : \overset{\$}{x} := \$1\tfrac{7}{8}. \qquad \frac{30 \times \frac{1}{8}}{2} = 1\tfrac{7}{8}, \textit{ Ans.}$$

(18)

$$\overset{\text{men}}{30} : \overset{\text{men}}{6} :: \overset{\text{da.}}{40} : \overset{\text{da.}}{x} = 8 \text{ da.} \qquad \frac{6 \times \overset{4}{\cancel{40}}}{\underset{3}{\cancel{30}}} = 8, \textit{ Ans.}$$

(19)

$$\overset{\text{bu.}}{1\tfrac{4}{11}} : \overset{\text{bu.}}{60} :: \overset{\$}{2\tfrac{5}{8}} : \overset{\$}{x} = \$115.50.$$

$$\frac{60 \times 2\frac{5}{8}}{1\frac{4}{11}} = \frac{\overset{4}{\cancel{60}} \times \frac{21}{8}}{\frac{\cancel{15}}{11}} = \frac{\frac{84}{8}}{\frac{1}{11}} = 115.50, \textit{ Ans.}$$

(20)

$$\overset{\text{yd.}}{4\tfrac{1}{2}} : \overset{\text{yd.}}{13\tfrac{1}{2}} :: \overset{\$}{9.75} : \overset{\$}{x} = \$29.25. \qquad \frac{\frac{27}{2} \times 9.75}{\frac{9}{2}} = 29.25, \textit{ Ans.}$$

(21)

$$\overset{\text{yd.}}{\tfrac{2}{5}} : \overset{\text{yd.}}{2\tfrac{1}{2}} :: \overset{\$}{\tfrac{7}{9}} : \overset{\$}{x} = \$4.861\tfrac{1}{9}. \qquad \tfrac{5}{2} \times \tfrac{7}{9} \times \tfrac{5}{2} = \frac{175}{36} = 4.861\tfrac{1}{9}.$$

(22)

$$\overset{\text{ship}}{\frac{3}{16}} : \overset{\text{ship}}{\frac{5}{32}} :: £273\ 2s.\ 6d. : \overset{£}{x} = £227\ 12s.\ 6d.$$

$$\begin{array}{r} £273\ 2s.\ 6d. \\ 20 \\ \hline 5462 \\ 12 \\ \hline 65550 \end{array}$$

$$\frac{5}{\underset{2}{\cancel{32}}} \times \frac{\overset{10925}{\overset{\cancel{21850}}{\cancel{65550}}}}{1} \times \frac{\cancel{16}}{\cancel{3}} = \overset{\text{d.}}{54625} = £227\ 12s.\ 1d., \textit{ Ans.}$$

(23)

$\overset{\text{ft.}}{12} : \overset{\text{ft.}}{122} :: \overset{\text{ft.}}{8} : \overset{\text{ft.}}{x} = 81\frac{1}{3}$ ft. $\quad \dfrac{122 \times \overset{2}{\cancel{8}}}{\underset{3}{\cancel{12}}} = \dfrac{244}{3} = 81\frac{1}{3}$, *Ans.*

(24)

$\overset{\text{hr.}}{15} : \overset{\text{hr.}}{12} :: \overset{\text{da.}}{22\frac{1}{2}} : \overset{\text{da.}}{x} = 18$ da. $\quad \dfrac{\overset{4}{\cancel{12}} \times \overset{4\frac{1}{2}}{\cancel{22\frac{1}{2}}}}{\underset{5}{\cancel{15}}} = 18$, *Ans.*

(25)

$$\begin{array}{rrcrrcrcl} \text{cwt.} & \text{qr.} & & \text{cwt.} & \text{qr.} & & \$ & & \$ \\ 7 & 1 & : & 4 & 2 & :: & 64.96 & : & x = \$40.32. \\ 4 & & & 4 & & & & & \\ \cline{1-1} \cline{4-4} 29 & & & 18 & & & & & \end{array}$$

$$\frac{18 \times 64.96}{29} = 40.32, \textit{ Ans.}$$

(26)

$\overset{\text{ct.}}{100} : \overset{\text{ct.}}{65} :: \overset{\$}{2750} : \overset{\$}{x} = \overset{\$}{1787\frac{1}{2}}$; $\quad \overset{\text{ct.}}{100} : \overset{\text{ct.}}{65} :: \overset{\$}{1975} : \overset{\$}{x} = \overset{\$}{1283\frac{3}{4}}$.

$\dfrac{65 \times \overset{55}{\cancel{2750}}}{\underset{2}{\cancel{100}}} = 1787.50. \qquad \dfrac{65 \times \overset{79}{\cancel{1975}}}{\underset{4}{\cancel{100}}} = \dfrac{5135}{4} = 1283.75.$

(27)

$$\underset{\substack{12\\ \overline{30}}}{\text{2s. 6d.}} : \underset{\substack{12\\ \overline{24}}}{\text{2s.}} :: \overset{\text{bot.}}{20} : \overset{\text{bot.}}{x} = 16\text{ bot.} \qquad \frac{\overset{8}{\cancel{24}} \times \overset{2}{\cancel{20}}}{\underset{3}{\cancel{30}}} = 16, \textit{ Ans.}$$

(28)

27 lambs = 9 sheep.

$$\overset{\text{sh.}}{6} : \overset{\text{sh.}}{9} :: \overset{\$}{15} : \overset{\$}{x} = \$22.50. \qquad \frac{\overset{3}{\cancel{9}} \times 15}{\underset{2}{\cancel{6}}} = \frac{45}{2} = 22.50,$$

(29)

$$4\tfrac{1}{7}\text{ gal.} = 16\tfrac{4}{7}\text{ qt.} \qquad \overset{\text{qt.}}{16\tfrac{4}{7}} : \overset{\text{qt.}}{1} :: \overset{\$}{2\tfrac{5}{9}} : \overset{\$}{x} = .15421+.$$

$$1 \times \tfrac{23}{9} \times \tfrac{7}{116} = \tfrac{161}{1044} = .15421+, \textit{ Ans.}$$

(30)

$$\overset{\text{in.}}{\tfrac{3}{5}} : \overset{\text{in.}}{\tfrac{5}{5}} :: \overset{\$}{3724.16} : \overset{\$}{x} = \$6206.93\tfrac{1}{3}.$$

$$3724.16 \times \frac{5}{\cancel{5}} \times \frac{\cancel{5}}{3} = 6206.93\tfrac{1}{3}, \textit{ Ans.}$$

(31)

3 — 1 = 2 gallons in cistern per 5 minutes.

$$\overset{\text{gal.}}{2} : \overset{\text{gal.}}{200} :: \overset{\text{min.}}{5} : \overset{\text{min.}}{x} = 8\text{ hr. } 20\text{ min.}$$

$$\frac{\overset{100}{\cancel{200}} \times 5}{\cancel{2}} = \overset{\text{min.}}{500} = 8\text{ hr. } 20\text{ min.}, \textit{ Ans.}$$

(32)

$$\overset{\text{da.}}{27} : \overset{\text{da.}}{18} :: \overset{\text{men}}{9} : \overset{\text{men}}{x} = 6\text{ men.} \qquad \frac{\overset{6}{\cancel{18}} \times \cancel{9}}{\underset{3}{\cancel{27}}} = 6, \textit{ Ans.}$$

(33)

$\overset{\text{men}}{1304} : \overset{\text{men}}{536} :: \overset{\text{da.}}{326} : \overset{\text{da.}}{x} = 134$ days.

$$\frac{\overset{134}{\cancel{536}} \times \cancel{326}}{\underset{\cancel{326}}{\cancel{1304}}} = 134,\ \textit{Ans.}$$

(34)

$\overset{\$}{34\frac{2}{3}} : \overset{\$}{175\frac{1}{5}} :: \overset{\text{bar.}}{4} : \overset{\text{bar.}}{x} = 20\frac{14}{65}$ bar.

$$\frac{\overset{219}{\cancel{876}}}{5} \times \overset{2}{\cancel{4}} \times \frac{3}{\underset{\underset{13}{\cancel{26}}}{\cancel{104}}} = 20\tfrac{14}{65}\ \text{bar.},\ \textit{Ans.}$$

(35)

$3\frac{1}{8}$ hhd. = $196\frac{7}{8}$ gal.

$\overset{\text{gal.}}{2\frac{1}{2}} : \overset{\text{gal.}}{196\frac{7}{8}} :: \overset{\$}{.65} : \overset{\$}{x} = \$51.1875$.

$$\frac{\overset{315}{\cancel{1575}}}{\underset{4}{\cancel{8}}} \times .65 \times \frac{\cancel{2}}{\cancel{5}} = 51.1875,\ \textit{Ans.}$$

(36)

$\overset{\text{bu.}}{36} : \overset{\text{bu.}}{6} ::$ £1 14s. 6d. $: \overset{\text{bu.}}{x} =$ 6s. 9d.

$$\begin{array}{r} 20 \\ \hline 34 \\ 12 \\ \hline 414 \end{array}$$

$$\frac{\cancel{6} \times \overset{69}{\cancel{414}}}{\underset{\cancel{6}}{\cancel{36}}} = 69\text{d.} = 5\text{s. } 9\text{d.},\ \textit{Ans}$$

(37)

$$\overset{\text{s.}}{5} : \overset{\text{guin.}}{90} = \overset{\text{s.}}{1890} :: \overset{\text{bu.}}{1} : \overset{\text{bu.}}{x} = 378 \text{ bu.} \qquad \frac{1890 \times 1}{5} = 378, \textit{ Ans.}$$

(38)

$$\overset{\$}{3500} : \overset{\$}{420} :: \overset{\$}{2100} : \overset{\$}{x} = \$252.$$

$$\frac{\overset{84}{\cancel{420}} \times \overset{3}{\cancel{2100}}}{\underset{\cancel{5}}{\cancel{3500}}} = 252, \textit{ Ans.}$$

(39)

$$\overset{\text{yd.}}{3} : \overset{\text{yd.}}{18} :: \overset{\text{yd.}}{4} : \overset{\text{yd.}}{x} = 24 \text{ yd.} \qquad \frac{\overset{6}{\cancel{18}} \times 4}{\cancel{3}} = 24, \textit{ Ans.}$$

(40)

$$\overset{\text{wid.}}{9} : \overset{\text{wid.}}{12} :: \overset{\text{len.}}{12} : \overset{\text{len.}}{x} = 16 \text{ in.} \qquad \frac{\overset{4}{\cancel{12}} \times \overset{4}{\cancel{12}}}{\cancel{9}} = 16, \textit{ Ans.}$$

(41)

$$.84 \times 25 = \$21.00.$$

$$\overset{\$}{21} : \overset{\$}{216} :: \overset{\text{hats}}{7} : \overset{\text{hats}}{x} = 72 \text{ hats.} \qquad \frac{\overset{72}{\cancel{216}} \times \cancel{7}}{\underset{\cancel{3}}{\cancel{21}}} = 72, \textit{ Ans.}$$

(42)

$$\overset{\$}{21.63} : \overset{\$}{114.33} :: \overset{\text{bbl.}}{7} : \overset{\text{bbl.}}{x} = 37 \text{ bbl.}$$

$$\frac{\overset{38.11}{\cancel{114.33}} \times \cancel{7}}{\underset{\underset{1.03}{\cancel{3.09}}}{\cancel{21.63}}} = 37, \textit{ Ans.}$$

(43)

$\overset{\text{lb.}}{15} : \overset{\text{lb.}}{36} :: \overset{\text{lb.}}{27} : \overset{\text{lb.}}{x} = 64\frac{4}{5}\text{ lb.}$ $\quad \frac{36 \times \overset{9}{\cancel{27}}}{\underset{5}{\cancel{15}}} = \frac{324}{5} = 64\frac{4}{5}$, *Ans.*

(44)

$\overset{\text{T.}}{42\frac{1}{2}} : \overset{\text{T.}}{2\frac{1}{2}} :: \overset{\$}{206.21} : \overset{\$}{x} = \$12.13.$

$\frac{\cancel{5}}{\cancel{2}} \times 206.21 \times \frac{\cancel{2}}{\underset{17}{\cancel{85}}} = 12.13$, *Ans.*

(45)

$\overset{\text{qt.}}{72} : \overset{\text{qt.}}{45} :: \overset{\text{bu.}}{40} : \overset{\text{bu.}}{x} = 25\text{ bu.}$ $\quad \frac{\overset{5}{\cancel{45}} \times \overset{5}{\cancel{40}}}{\underset{\cancel{8}}{\cancel{72}}} = 25$, *Ans.*

(46)

40 − 15 = 25 gal. remaining per hour.

$\overset{\text{gal.}}{25} : \overset{\text{gal.}}{700} :: \overset{\text{hr.}}{1} : \overset{\text{hr.}}{x} = 28\text{ hr.}$ $\quad \frac{\overset{28}{\cancel{700}} \times 1}{\cancel{25}} = 28$, *Ans.*

(47)

$\overset{\text{rd.}}{12\frac{1}{2}} : \overset{\text{rd.}}{26\frac{2}{3}} : \overset{\text{A.}}{1\frac{1}{4}} : \overset{\text{A.}}{x} = 2\frac{2}{3}\text{ A.}$

$\frac{\overset{\overset{4}{\cancel{16}}}{\cancel{80}}}{3} \times \frac{\cancel{5}}{\cancel{4}} \times \frac{2}{\underset{\cancel{5}}{\cancel{25}}} = \frac{8}{3} = 2\text{ A.}$ 2 rods $26\frac{2}{3}$ poles, *Ans.*

(48)

The board of 6 women = board of 3 men;
3 men and 6 women = 6 men.

$\overset{\text{men}}{13} : \overset{\text{men}}{6} :: \overset{\$}{39.585} : \overset{\$}{x} = \$18.270.$

$\frac{6 \times \overset{3.045}{\cancel{39.585}}}{\cancel{13}} = 18.270$, *Ans.*

(49)

4 bu. 3 pk. = 4.75 bu.

$$\overset{\text{bu.}}{4.75} : \overset{\text{bu.}}{75} :: \overset{\$}{10.687} : \overset{\$}{x} = \$168.7421+.$$

$$\frac{\overset{3}{\cancel{75}} \times 10.687}{\underset{.19}{\cancel{4.75}}} = 168.7421,\ \textit{Ans.}$$

DOUBLE RULE OF THREE.

(1)

$$\left.\begin{matrix}96\\200\end{matrix}\right\} : \left.\begin{matrix}480\\75\end{matrix}\right\} :: 24 : x = 45. \qquad \frac{\overset{5}{\cancel{480}} \times \overset{3}{\cancel{75}} \times \overset{3}{\cancel{24}}}{\cancel{96} \times \underset{\cancel{8}}{\cancel{200}}} = \$45,\ \textit{Ans.}$$

(2)

$$\left.\begin{matrix}1\frac{1}{2}\\6\end{matrix}\right\} : \left.\begin{matrix}450\\4\end{matrix}\right\} :: 12 : x = 150.$$

$$\frac{\overset{50}{\cancel{450}} \times 4 \times 12}{1\frac{1}{2} \times 6 = \cancel{9}} = 2400 \text{ oz.} = 150 \text{ lb.},\ \textit{Ans.}$$

(3)

$$\left.\begin{matrix}6\\14\end{matrix}\right\} : \left.\begin{matrix}9\\11\end{matrix}\right\} :: 84 : x = 99. \qquad \frac{9 \times 11 \times \overset{\cancel{6}}{\cancel{84}}}{\cancel{6} \times \cancel{14}} = \$99,\ \textit{Ans.}$$

(4)

$$154 : 406 :: \left.\begin{matrix}14\\44\end{matrix}\right\} : \left.\begin{matrix}7\\x\end{matrix}\right\}$$

$$\frac{\overset{58}{\cancel{406}} \times \overset{2}{\cancel{14}} \times \overset{2}{\cancel{44}}}{\cancel{7} \times \underset{\cancel{7}}{\cancel{154}}} = 232 \text{ days},\ \textit{Ans.}$$

(5)

$$\left.\begin{matrix}7\\6\end{matrix}\right\} : \left.\begin{matrix}9\\11\end{matrix}\right\} :: 217 : x = 511\tfrac{1}{2}.$$

$$\frac{\overset{3}{\cancel{9}}\times 11\times \overset{31}{\cancel{217}}}{\cancel{7}\times \underset{2}{\cancel{6}}} = \frac{1023}{2} = 511\tfrac{1}{2}\text{ miles, } \textit{Ans.}$$

(6)

$$6250 : 11250 : \left.\begin{matrix}25\\2\end{matrix}\right\} : \left.\begin{matrix}5\\x\end{matrix}\right\}$$

$$\frac{\overset{\overset{9}{\cancel{45}}}{\cancel{11250}}\times\cancel{25}\times 2}{\underset{\cancel{25}}{\cancel{6250}}\times\cancel{5}} = 18\text{ years, } \textit{Ans.}$$

(7)

$$250 : 607\tfrac{1}{2} :: \left.\begin{matrix}15\\10\\10\end{matrix}\right\} : \left.\begin{matrix}x\\9\\15\end{matrix}\right\}$$

$$\frac{\dfrac{\overset{\overset{27}{\cancel{135}}}{\cancel{1215}}}{\cancel{2}}\times\cancel{15}\times\overset{\cancel{5}}{\cancel{10}}\times\cancel{10}}{\underset{\underset{\cancel{5}}{\cancel{25}}}{\cancel{250}}\times\cancel{9}\times\cancel{15}} = 27\text{ weavers, } \textit{Ans.}$$

(8)

The elements of cost are the number of men and cost per bottle.

$$20 : 12 :: \left.\begin{matrix}100\\30\end{matrix}\right\} : \left.\begin{matrix}x\\25\end{matrix}\right\}$$

$$\frac{12\times\overset{\cancel{4}}{\cancel{100}}\times\overset{6}{\cancel{30}}}{\underset{\cancel{5}}{\cancel{20}}\times\cancel{25}} = 72\text{ men, } \textit{Ans.}$$

(9)

$$341 : 155 :: \left.\begin{matrix}7\frac{1}{3}\\12\frac{1}{2}\end{matrix}\right\} : \left.\begin{matrix}x\\10\frac{1}{3}\end{matrix}\right\}$$

$$\frac{\overset{5}{\cancel{155}} \times \frac{\overset{2}{\cancel{22}}}{\cancel{3}} \times \frac{25}{\cancel{2}}}{\underset{\cancel{11}}{\cancel{341}} \times \frac{31}{\cancel{3}}} = \frac{125}{31} = 4\tfrac{1}{31} \text{ days, } \textit{Ans.}$$

(10)

$$\left.\begin{matrix}25\\12\end{matrix}\right\} : \left.\begin{matrix}139\\8\end{matrix}\right\} :: 300 : x = 1112. \qquad \frac{139 \times 8 \times \overset{\cancel{12}}{\cancel{300}}}{\cancel{25} \times \cancel{12}} = 1112 \text{ bu.}$$

(11)

$$\left.\begin{matrix}96\\52\frac{1}{2}\end{matrix}\right\} : \left.\begin{matrix}32\\120\end{matrix}\right\} :: 3\tfrac{3}{4} : x = 2\tfrac{6}{7}.$$

$$\frac{\cancel{32} \times \overset{\overset{10}{\cancel{30}}}{\cancel{120}} \times \frac{\cancel{15}}{\cancel{4}}}{\overset{7}{\frac{\cancel{105}}{2}} \times \underset{\cancel{3}}{\cancel{96}}} = \frac{20}{7} = 2\tfrac{6}{7} \text{ tons, } \textit{Ans.}$$

(12)

$$2.45 : 31.72 :: \left.\begin{matrix}21\\13\frac{1}{8}\end{matrix}\right\} : \left.\begin{matrix}x\\10\frac{2}{5}\end{matrix}\right\} = 343\tfrac{1}{8}.$$

$$\frac{\overset{.61}{\cancel{31.72}} \times \overset{3}{\cancel{21}} \times \frac{\overset{15}{\cancel{105}}}{8}}{\overset{.01}{\overset{\cancel{.49}}{\cancel{2.45}}} \times \frac{\cancel{52}}{\cancel{5}}} = \frac{.61 \times 3 \times 15}{.01 \times 8} = 343\tfrac{1}{8}, \textit{ Ans.}$$

(13)

$$\left.\begin{matrix}14\\6\end{matrix}\right\} : \left.\begin{matrix}60\\3\end{matrix}\right\} :: 7 : x = 15. \qquad \frac{\overset{\overset{5}{\cancel{30}}}{\cancel{60}} \times 3 \times \cancel{7}}{\underset{\cancel{2}}{\cancel{14}} \times \cancel{6}} = 15 \text{ lb., } \textit{Ans.}$$

(14)

$$\left.\begin{matrix}500\\210\end{matrix}\right\} : \left.\begin{matrix}1200\\280\end{matrix}\right\} :: 12 : x = 38\tfrac{2}{5}.$$

$$\frac{12\cancel{0}\cancel{0} \times \overset{4}{\cancel{28}\cancel{0}} \times \overset{4}{\cancel{12}}}{5\cancel{0}\cancel{0} \times \underset{3}{\cancel{21}\cancel{0}}} = \frac{192}{5} = 38\tfrac{2}{5} \text{ reams, } \textit{Ans.}$$

(15)

$$\underset{260}{9 \text{ T. } 15 \text{ cwt. } 0 \text{ qr. } 20 \text{ lb.}} : \underset{189}{25 \text{ T. } 16 \text{ cwt. } 3 \text{ qr.}} :: 76.50 : x.$$

$$\frac{\overset{10335}{\cancel{51675}} \times 189 \times \overset{7.65}{\cancel{76.50}}}{\underset{3904}{\cancel{19520}} \times \underset{26}{\cancel{260}}} = \$147.2144+, \textit{ Ans.}$$

(16)

$$\left.\begin{matrix}17\frac{1}{2}\\10\frac{1}{2}\\13\end{matrix}\right\} : \left.\begin{matrix}12\\10\\7\end{matrix}\right\} :: 546 : x = 192.$$

$$\frac{12 \times 10 \times \cancel{7} \times \overset{42}{\cancel{546}}}{\frac{\overset{5}{\cancel{35}}}{2} \times \frac{21}{2} \times \cancel{13}} = 192 \text{ bbl., } \textit{Ans.}$$

(17)

$$\overset{\text{mi.}}{24} - \overset{\text{mi.}}{10} = \overset{\text{mi.}}{14} \text{ yet to be finished;}$$

$$\overset{\text{mo.}}{8} - \overset{\text{mo.}}{5} = \overset{\text{mo.}}{3}, \text{ time to finish it.}$$

$$10 \quad 14 :: \left.\begin{matrix}150\\5\end{matrix}\right\} : \left.\begin{matrix}x\\3\end{matrix}\right\} \qquad \frac{14 \times \overset{\overset{5}{\cancel{15}}}{\cancel{150}} \times 5}{\cancel{10} \times \cancel{3}} = 350 \text{ men.}$$

350 − 150 = 200 men additional, *Ans.*

(18)

$$\left.\begin{array}{r}336\\5\\10\end{array}\right\} : \left.\begin{array}{r}240\\9\\12\end{array}\right\} :: \left.\begin{array}{r}70\\5\\3\\2\end{array}\right\} : \left.\begin{array}{r}x\\6\\5\\3\end{array}\right\}$$

$$\frac{\overset{\cancel{10}}{\cancel{240}} \times 9 \times \overset{2}{\cancel{12}} \times \overset{\cancel{5}}{\cancel{70}} \times \cancel{5} \times \cancel{3} \times 2}{\underset{\cancel{14}}{\cancel{336}} \times \cancel{5} \times \cancel{10} \times \cancel{6} \times \cancel{5} \times \cancel{3}} = 36 \text{ yd., } \textit{Ans.}$$

PARTNERSHIP.

(2)

$$2100 : 1800 :: 1000 : x = 857.142\tfrac{6}{7};$$

$$\frac{\overset{6}{\cancel{1800}} \times 1000}{\underset{7}{\cancel{2100}}} = \frac{6000}{7} = \$857.142\tfrac{6}{7}, \textit{ Ans.}$$

$$2100 : 300 :: 1000 : x = 142.857\tfrac{1}{7};$$

$$\frac{\cancel{300} \times 1000}{\underset{7}{\cancel{2100}}} = \frac{1000}{7} = \$142.857\tfrac{1}{7}, \textit{ Ans.}$$

(3)

$$3200 + 5000 + 4500 = 12700, \text{ entire capital.}$$

$$12700 : 3200 :: 1905 : x = 480;$$

$$\frac{32\cancel{00} \times \overset{15}{\cancel{1905}}}{\cancel{12700}} = \$480, \textit{ Ans.}$$

$$12700 : 5000 :: 1905 : x = 750;$$

$$\frac{50\cancel{00} \times \overset{15}{\cancel{1905}}}{\cancel{12700}} = \$750, \textit{ Ans.}$$

$$12700 : 4500 :: 1905 : x = 675;$$

$$\frac{45\cancel{00} \times \overset{15}{\cancel{1905}}}{\cancel{12700}} = \$675, \textit{ Ans.}$$

(4)

The partial stocks are to each other as 1, 2, and 3.

$1 + 2 + 3 = 6$, number which denotes the entire stock; hence

$6 : 1 :: 2400 : x = 400$; $\frac{1 \times 2400}{6} = \$400$, *Ans.*

$6 : 2 :: 2400 : x = 800$; $\frac{2 \times \overset{400}{\cancel{2400}}}{\cancel{6}} = \$800$, *Ans.*

$6 : 3 :: 2400 : x = 1200$; $\frac{3 \times 2400}{6} = \$1200$, *Ans.*

(5)

$300 + 450 + 500 = 1250$, whole number of cattle.

$1250 : 300 :: 275 : x = 66$; $\frac{\overset{6}{\cancel{300}} \times \overset{11}{\cancel{275}}}{\underset{\cancel{25}}{\cancel{1250}}} = \$66$, *Ans.*

$1250 : 450 :: 275 : x = 99$; $\frac{\overset{9}{\cancel{450}} \times \overset{11}{\cancel{275}}}{\underset{\cancel{25}}{\cancel{1250}}} = \$99$, *Ans.*

$1250 : 500 :: 275 : x = 110$; $\frac{\overset{10}{\cancel{500}} \times \overset{11}{\cancel{275}}}{\underset{\cancel{25}}{\cancel{1250}}} = \$110$, *Ans.*

(6)

$4725 - 300 = \$4425$, sum to be divided according to stock.

$7000 : 5000 :: 4425 : x = 3160.714\frac{2}{7}$;

$\frac{5\cancel{0}\cancel{0}\cancel{0} \times 4425}{7\cancel{0}\cancel{0}\cancel{0}} = \$3160.714\frac{2}{7}$, *Ans.*

$7000 : 2000 :: 4425 : x = 1264.285\frac{5}{7}$;

$\frac{2\cancel{0}\cancel{0}\cancel{0} \times 4425}{7\cancel{0}\cancel{0}\cancel{0}} = \$1264.285\frac{5}{7}$;

$1264.285\frac{5}{7} + 300 = \$1564.285\frac{5}{7}$, *Ans.*

(7)

$\frac{1}{3}$ of 4000 = $1333\frac{1}{3}$ due to A for extra services.

4000 − $1333\frac{1}{3}$ = $2666\frac{2}{3}$, sum to be divided according to stock.

Since B and C each contribute twice as much as A, B and C each must have contributed $\frac{2}{5}$ and A $\frac{1}{5}$ of $20000; $\frac{1}{5}$ of 20000 = 4000; $\frac{2}{5}$ of 20000 = 8000.

$$20000 : 8000 :: 2666\tfrac{2}{3} : x = 1066.66\tfrac{2}{3};$$

$$\frac{\overset{2}{\cancel{8000}} \times \dfrac{\overset{1600}{\cancel{8000}}}{3}}{\underset{5}{\cancel{20000}}} = \frac{3200}{3} = \$1066.66\tfrac{2}{3}.$$

$$20000 : 4000 :: 2666\tfrac{2}{3} : x = 533.33\tfrac{1}{3};$$

$$\frac{\cancel{4000} \times \dfrac{\overset{1600}{\cancel{8000}}}{3}}{\underset{5}{\cancel{20000}}} = \frac{1600}{3} = \$533.33\tfrac{1}{3}.$$

1066.66\frac{2}{3}$, share of B and C;

$533.33\frac{1}{3} + 1333\frac{1}{3}$ = 1866.66\frac{2}{3}$, A's share.

(8)

$\frac{1}{2} + \frac{1}{3} + \frac{1}{6} = \frac{3}{6} + \frac{2}{6} + \frac{1}{6} = \frac{6}{6}$, or 6 equal parts; of which one owns 3 parts, another 2 parts, and the third 1 part.

$6 : 3 :: 1350 : x = 675$; $\frac{1350 \times 3}{6}$ = $675, *Ans.*

$6 : 2 :: 1350 : x = 450$; $\frac{1350 \times 2}{6}$ = $450, *Ans.*

$6 : 1 :: 1350 : x = 225$; $\frac{1350 \times 1}{6}$ = $225, *Ans.*

(2)

$$\begin{array}{r} 550 \times 7 = 3850 \\ 1625 \times 8 = \underline{13000} \\ 16850 \end{array}$$

16850, sum of products.

$16850 : 3850 :: 337 : x = \$77$, *Ans.*

$16850 : 13000 :: 337 : x = \$260$, *Ans.*

(3)

$$\begin{array}{r} 12 \times 9 = 108 \\ 11 \times 7 = \underline{77} \\ 185 \end{array}$$

185, sum of products.

$185 : 108 :: 92.50 : x = \$54$, A.

$185 : 77 :: 92.50 : x = \$38.50$, B.

(4)

$$\begin{array}{r} 400 \times 5 = 2000 \\ 600 \times 7 = 4200 \\ 960 \times 8 = 7680 \\ 1200 \times 9 = \underline{10800} \\ 24680 \end{array}$$

$24680 : 2000 :: 750 : x = \$60.777+$, A's share.

$24680 : 4200 :: 750 : x = 127.633+$, B's "

$24680 : 7680 :: 750 : x = 233.387+$, C's "

$24680 : 10800 :: 750 : x = 328.201+$, D's "

(5)

3, 5, and 7 are numbers, proportional to the stocks.

$$\begin{array}{r} 3 \times 1 = 3 \\ 5 \times 1\frac{2}{5} = 7 \\ 7 \times 2\frac{3}{7} = \underline{17} \\ 27 \end{array}$$

$27 : 3 :: 15000 : x = \$1666.666\frac{2}{3}$, A's share.

$27 : 7 :: 15000 : x = 3888.888\frac{8}{9}$, B's "

$27 : 17 :: 15000 : x = 9444.444\frac{4}{9}$, C's "

(6)

A's stock was in trade 12 months.
B's " " " 9 "

$$\begin{aligned} 3400 \times 12 &= 40800 \\ 2600 \times 9 &= \underline{23400} \\ &\ 64200 \end{aligned}$$

$64200 : 40800 :: 750 : x = \$476.635+$, A's share.
$64200 : 23400 :: 750 : x = 273.364+$, B's "

(7)

Fuller put in $6000 for 18 months, and $2000 for 14 months.
Brown put in $5000 for 18 months, and $2500 for 12 months.
Dexter put in $9000 for 12 months, and $7000 for 6 months.

$$\begin{aligned} 6000 \times 18 &= 108000 \\ 2000 \times 14 &= \underline{28000} \\ \text{Fuller's} &= 136000 \end{aligned}$$

$$\begin{aligned} 5000 \times 18 &= 90000 \\ 2500 \times 12 &= \underline{30000} \\ \text{Brown's} &= 120000 \end{aligned}$$

$$\begin{aligned} 9000 \times 12 &= 108000 \\ 7000 \times 6 &= \underline{42000} \\ \text{Dexter's} &= 150000 \end{aligned}$$

$$\begin{aligned} &136000 \\ &120000 \\ &\underline{150000} \\ &406000\text{, sum of products.} \end{aligned}$$

$406000 : 136000 :: 5400 : x = \$1808.8669+$, Fuller's.
$406000 : 120000 :: 5400 : x = 1596.0591+$, Brown's.
$406000 : 150000 :: 5400 : x = 1995.0738+$, Dexter's.

PERCENTAGE.

(7)

$1000 \times .00\frac{1}{2} = 5.00$ oxen, *Ans.*

(11)

$850\frac{3}{5} = 850.6$; $850.6 \times 1.05 = 893.13$ T., *Ans.*

(12)

$875\frac{9}{16} = 875.5625$; $875.5625 \times 1.16 = 1015.6525$ lb., *Ans.*

(14)

$200 \times .037\frac{1}{2} = \$7.50$, *Ans.*

(15)

$687.24 \times .0033\frac{1}{3} = \$2.2908$, *Ans.*

(16)

$400 \times .0087\frac{1}{2} = \$3.50$, *Ans.*

(17)

$225.40 \times .000\frac{7}{8} = \$0.197225$, *Ans.*

(18)

$852 \times .05 = \$42.60$, *Ans.*

(19)

$1200 \times .64 = 768$ bbls. shipped;
$1200 - 768 = 432$ bbls. sold, *Ans.*

(20)

$1200 \times .03\frac{1}{2} = 42$ hhd., *Ans.*

(21)

$800 \times .05\frac{1}{2} = 44.00$; $1050 \times .06\frac{1}{2} = 68.25$.
$68.25 - 44.00 = \$24.25$, *Ans.*

(22)

$$\begin{array}{rcr} 240 \times .18\frac{1}{2} & = & \$44.40 \\ 240 \times .14 & = & 33.60 \\ \hline & & \$10.80, \text{ or} \end{array}$$

$.18\frac{1}{2} - .14 = .04\frac{1}{2}$, difference;
$240 \times .04\frac{1}{2} = \$10.80$, *Ans.*

(23)

$.15 + .33\frac{1}{3} + .25 = .73\frac{1}{3}$; $1.00 - .73\frac{1}{3} = .26\frac{2}{3}$, left;
$12500 \times .26\frac{2}{3} = \$3333.33\frac{1}{3}$ value, *Ans.*

(24)

$.18 + .50 = .68$; $1.00 - .68 = .32$ remainder.

$850 \times .18 = 153.$ $1.25 \times 153 = \$191.25$
$850 \times .50 = 425.$ $1.50 \times 425 = 637.50$
$850 \times .32 = 272.$ $1.75 \times 272 = 476.00$

$1304.75, *Ans.*

(1)

$5 \div 20 = .25$, or 25 per cent., *Ans.*

(2)

$40 \div 80 = .50$, or 50 per cent., *Ans.*

(3)

$80 \div 200 = .40$, or 40 per cent., *Ans.*

(4)

$90 \div 1800 = .05$, *Ans.*

(5)

$9 \div 870 = .01\frac{1}{29}$, *Ans.*

(6)

$48 \div 1600 = .03$, *Ans.*

(7)

$8.62\frac{1}{2} \div 75.25 = .11\frac{139}{301}$.

(8)

$\frac{5}{6} \div \frac{3}{4} = \frac{20}{18} = 1.11\frac{1}{9}$, or $111\frac{1}{9}$ per cent., *Ans.*

(9)

$37.625 \div 16.1875 = 2.32\frac{16}{37}$, *Ans.*

(10)

$.875 \div .125 = 7.$, or 700 per cent., *Ans.*

(11)

$15 \div 65 = .23\frac{1}{13}$, *Ans.*

(12)

$27 \div 35 = .77\frac{1}{7}$, *Ans.*

(13)

$82.75 \div 550 = .15\frac{1}{22}$, *Ans.*

(14)

$100 - 20 = 80$ per cent. rem.;

$1500 \times .80 = 1200$; $660 \div 1200 = .55$, *Ans.*

(15)

$60 \div 300 = .20$, *Ans.*

(16)

$7296 - 5682 = 1614$; $1614 \div 5682 = .28\frac{384}{947}$, *Ans.*

(17)

$42.40 \times 75 = \$3180$; $3577.50 - 3180 = 397.50$, gain;

$397.50 \div 3180 = .12\frac{1}{2}$, *Ans.*

(1)

$960 \div .25 = 3840$, *Ans.*

(2)

$74 \div .62\frac{1}{2} = 118.4$, *Ans*

(3)

$450 \div 1.12 = 401.785\frac{5}{7}$, *Ans.*

(4)

$66 \div .00\frac{2}{3} = 9900$, *Ans.*

(5)

$1.75 \div .37\frac{1}{2} = 4.666\frac{2}{3}$, *Ans.*

(6)

$\frac{5}{6} \div .00\frac{7}{8} = \frac{5}{6} \div .00875 = \frac{5}{6} \times \frac{100000}{875} = 95.23809+$, *Ans.*

(7)

$77 \div .875 = 88$, *Ans.*

(8)

$15624 \div .56 = 27900$, *Ans.*

(9)

$16 \div .80 = 20$, *Ans.*

(10)

$100 - 18\frac{1}{2} = 81\frac{1}{2}$ per cent.;
$370 \div .185 = 2000$, whole profit;
$2000 \times .81\frac{1}{2} = 1630$, B's share.

COMMISSION.

(1)

$27560 \times .05 = \$1378.00$, *Ans.*

(2)

$5695 \times .09\frac{1}{2} = \$541.025$, *Ans.*

(3)

$1756.75 \times .03 = \$52.7025$;
$1756.75 - 52.7025 = \$1704.0475$.

(4)

$425 \times 60 = 25500$;
$25500 \times .02\frac{1}{2} = 637.50$; $25500 - 637.50 = \$24862.50$, *Ans.*

(5)

$2 + 1\frac{1}{2} = 3\frac{1}{2}$ per cent. allowed
$8750 \times .03\frac{1}{2} = 306.25$; $8750 - 306.25 = \$8443.75$, *Ans.*

(6)

$4250 \times .10 = 425.00$, advance;
$4250 + 425 = 4675$, selling price;
$4675 \times .05 = \$233.75$, commission, *Ans.*

(7)

$.05 + .02\frac{1}{2} = .07\frac{1}{2}$. $2765.50 \times .07\frac{1}{2} = \$207.4125$, *Ans.*

(8)

$3650 \times .02\frac{1}{2} = \$91.25$, commission on purchase;
$3650 \times 1.15 = \$4197.50$, advanced value;
$4197.50 \times .02\frac{1}{2} = \$104.9375$, commission on sale;
$104.9375 + 91.25 = \$196.1875$, entire commission.

(9)

$650 + 5 = \$655$, cost per lot;
$655 \times 25 = \$16375$, cost of lots;
$16375 \times .04 = \$655$, commission;
$16375 + 655 = \$17030$, entire cost, *Ans.*

(10)

$5 \div 60 = .08\frac{1}{3}$, or $8\frac{1}{3}$ per cent. commission;
$570 \times .08\frac{1}{3} = \$47.50$, or $47\frac{1}{2}$, *Ans.*

(11)

$850 \div 30000 = .02\frac{5}{6}$, or $2\frac{5}{6}$ per cent., *Ans.*

(1)

$750 \div 1.07\frac{1}{2} = \$697.6744\frac{8}{43}$, *Ans.*

(2)

$5413.05 \div 1.035 = \$5230$, present value;
$5413.05 - 5230 = \$183.05$, commission, *Ans.*

(3)

$20119 \div 1.05\frac{1}{2} = \$19070.142+$, *Ans.*

(4)

$2657.20 \div 1.04 = \$2555$; $2555 \div 7 = \$365$, *Ans.*

(5)

25000 ÷ .02$\frac{1}{4}$ = $24449.877+, present value;
25000 − 24449.877+ = $550.122+, *Ans.*

(6)

12600 ÷ 1.05 = $12000, money expended;
12600 − 12000 = $600, commission, *Ans.*

(7)

5000 ÷ 1.03 = $4854.3689+, present value;
5000 − 4854.3689 = $145.6311, commission, *Ans.*

(8)

5679.45 ÷ 1.17 = 4854.23\frac{1}{13}$, *Ans.*

(9)

$2\frac{1}{2} + 1\frac{1}{2}$ = 4 per cent.;
5642.48 ÷ 1.04 = $5425.46153+, *Ans.*

(10)

$2\frac{1}{2} + 1\frac{1}{4} + 1\frac{1}{4}$ = 5 per cent.;
21630 ÷ 1.05 = $20600, sum laid out;
20600 ÷ .15 = 137333\frac{1}{3}$, *Ans.*

PROFIT AND LOSS.

(1)

3750 × .06 = $225.00, *Ans.*

(2)

12750 × 18.75 = $2390.625, *Ans.*

(3)

24760 × .06 = $1485.60, *Ans.*

(4)

28 × $1\frac{1}{4}$ = \$35; 35 × .15 = \$5.25;

35 − 5.25 = \$29.75; 29.75 ÷ 28 = \$1.0625, *Ans.*

(5)

3517.10 × .10 = \$351.71; 3517.10 − 351.71 = \$3165.39;

3165.39 ÷ 3275 = \$0.96653+, *Ans.*

(6)

0.75 × 50 = \$37.50, whole cost;

37.50 × .10 = \$3.75; 37.50 + 3.75 = \$41.25;

41.25 ÷ 40 = \$1.03125, *Ans.*

(7)

0.20 × 158 = \$31.60, cost; 31.60 ÷ 2 = \$15.80, half cost;

15.80 × .06 = \$0.948; 15.80 − 0.948 = \$14.852;

15.80 × .19 = \$3.002; 15.80 + 3.002 = \$18.802;

14.852 + 18.802 = \$33.654; 33.654 − 31.60 = \$2.054, *Ans.*

(1)

1850.50 − 1517.41 = \$333.09, loss;

333.09 ÷ 1850.50 = .18, *Ans.*

(2)

12 − 10 = 2 cents gain per lb.;

2 ÷ 10 = .20, or 20 per cent. gain;

2 × 650 = \$13.00, entire gain.

(3)

315 − 275 = 40, gain; 40 ÷ 275 = $.14\frac{6}{11}$, *Ans.*

(4)

3750 + 250 = \$4000, cost; 5725 − 4000 = \$1725, gain;

1725 ÷ 4000 = $.43\frac{1}{8}$, or $43\frac{1}{8}$ per cent. gain, *Ans.*

(1)

350 ÷ 1.25 = \$280, *Ans.*

(2)

170 ÷ .85 = \$200, *Ans.*

(3)

12500 ÷ 1.25 = $10000, cost;
150 + 75 = $225, expense;
12500 − 10000 = $2500, gain;
2500 − 225 = 2275, net gain, *Ans.*

(4)

25600 ÷ 1.31 = $19541.9847, cost of invoice;
25600 − 19541.9847 = $6058.0153, gain;
25600 × .05 = $1280, commission;
6058.0153 − 1280 = $4778.0153, net gain, *Ans.*

INSURANCE.

(1)

8754 × $.00\frac{1}{2}$ = $43.77, *Ans.*

(2)

37500 × $.03\frac{1}{2}$ = $1312.50, *Ans.*

(3)

47520 × $.00\frac{1}{2}$ = $237.60. 47520 × $.00\frac{1}{3}$ = $158.40.

(4)

28800 × $.01\frac{3}{4}$ = $504, *Ans.*

(5)

$\frac{3}{4}$ of 24000 = $18000; 18000 × $.02\frac{1}{2}$ = $450, *Ans.*

(6)

36000 − 12000 = $24000; 24000 × $.05\frac{1}{2}$ = $1320, *Ans.*

(7)

$3440 \times .02\frac{3}{8} = 81.70$

$10000 \times .01\frac{1}{4} = 125.00$

$1500 \times .03\frac{1}{4} = \underline{48.75}$

$\$255.45$, entire premium.

(8)

$3.25 \times 36\frac{1}{2} \times 250 = \$29656.25$, cost;

$36\frac{1}{2} \times 250 \times 4\frac{1}{2} = \$41062.50$, selling price;

$41062.50 \times .04\frac{1}{2} = \$1847.8125$, premium;

$41062.50 - (29656.25 + 1847.8125) = \$9558.4375$, gain.

(9)

$65000 \times .20 = \$13000$; $13000 \times .50 = \$6500$, *Ans.*

STOCKS AND BROKERAGE.

(2)

$200 \times 50 = \$10000$, par value;

$10000 \times 1.20 = \$12000$, *Ans.*

(3)

$25600 \times .87\frac{5}{8} = \$22432$, *Ans.*

(4)

$100 - 85 = 15$ per cent. gain;

$98000 \times .15 = \$14700$, gain, *Ans.*

(5)

$50000 \times .00\frac{3}{8} = \$187.50$, *Ans.*

(6)

$100 - 9 = 91$ per cent. market value;

$91 + \frac{1}{4} = 91\frac{1}{4}$, cost per cent.;

$100 \times 175 = \$17500$, par value;

$17500 \times .91\frac{1}{4} = \$15968.75$, *Ans.*

(7)

$100 + 8 = 108$ per cent., market value;

$108 + \frac{5}{8} = 108\frac{5}{8}$, cost;

$100 \times 250 = \$25000$, par value;

$25000 \times 1.08\frac{5}{8} = \$27156.25$, *Ans.*

(2)

$15525 \div 1.035 = \$15000$, *Ans.*

(3)

$2730 \div 1.05 = 2600$, par value;

$2600 \div 25 = 104$ shares, *Ans.*

(4)

$20450 \div 1.02\frac{1}{4} = \$20000$, *Ans.*

(5)

$100 - 24 = 76$ per cent., market value;

$9195 \div .76\frac{5}{8} = 12000$;

$12000 \div 100 = 120$ shares, *Ans.*

INTEREST.

(1)

$650 \times .06 = \$39.00$, *Ans.*

(2)

$950 \times .07 \times 4 = \$266$, *Ans.*

(3)

3675 × .07 × 3 = $771.75, interest;
3675 + 771.75 = $4446.75, *Ans.*

(4)

459 × .08 × 5 = $183.60, interest,
459 + 183.60 = $642.60, *Ans.*

(5)

211.26 × .04½ = $9.5067, *Ans.*

(6)

1576.91 × .07 × 3 = $331.1511, *Ans.*

(7)

957.08 × .03½ × 6 = $200.9868, interest;
957.08 + 200.9868 = $1158.0668, *Ans.*

(8)

375.45 × .00⅞ × 7 = $22.9963125, *Ans.*

(9)

4049.87 × .05 × 2 = $404.987;
4049.87 + 404.987 = $4454.857, *Ans.*

(10)

16199.48 × .05½ × 16 = $14255.5424, interest;
16199.48 + 14255.5424 = $30455.0224, *Ans.*

(11)

326.50 × .07 × 4⅙ = 95.2291⅔, *Ans.*

(12)

437.21 × .03 × 9¼ = $121.3257¾, *Ans.*

(13)

$1119.48 \times .07 \times 2\frac{1}{2} = \$195.909$, interest;
$1119.48 + 195.909 = \$1315.389$, *Ans.*

(14)

$179.25 \times .07 \times 3\frac{1}{3} = \$41.825$, interest;
$41.825 + 179.25 = \$221.075$, *Ans.*

(15)

$1046.24 \times .05\frac{1}{2} \times \frac{1}{4} = \$14.3858$, interest;
$14.3858 + 1046.24 = \$1060.6258$, *Ans.*

(16)

$6704.25 \times .06\frac{1}{2} \times 1\frac{1}{3} = \$581.035$, interest;
$581.035 + 6704.25 = \$7285.285$, *Ans.*

(17)

$3750.87 \times .08 \times 2\frac{3}{4} = \$825.1914$, interest;
$825.1914 + 3750.87 = \$4576.0614$, *Amt.*

(1)

1 yr. 4 mo. 10 da. = $16.3\frac{1}{3}$ mo.

$132.26 \times .06 = 7.9356$, int. of 1 yr.;
$7.9356 \div 12 = .6613$, int. of 1 mo.;
$.6613 \times 16.3\frac{1}{3} = \$10.80123\frac{1}{3}$, *Ans.*

(2)

1 yr. 9 mo. 12 da. = 21.4 mo.

$25.50 \times .06 = 1.53$, int. of 1 yr.;
$1.53 \div 12 = .1275$, int. of 1 mo.;
$.1275 \times 21.4 = \$2.7285$, *Ans.*

(3)

2 yr. 6 mo. 21 da. $= 30.7$ mo.

$1728.60 \times .07 = 121.002$, int. of 1 yr.;
$121.002 \div 12 = 10.0835$, int. of 1 mo.;
$10.0835 \times 30.7 = \$309.56345$, *Ans.*

(4)

1 yr. 8 mo. 27 da. $= 20.9$ mo

$288.30 \times .07 = 20.181$, int. of 1 yr.;
$20.181 \div 12 = 1.68175$, int. of 1 mo.;
$1.68175 \times 20.9 = \$35.148575$, *Ans.*

(5)

10 mo. 18 da. $= 10.6$ mo.

$576.60 \times .06 = 34.596$, int. of 1 yr.;
$34.596 \div 12 = 2.883$, int. of 1 mo.;
$2.883 \times 10.6 = \$30.5598$, *Ans.*

(6)

3 mo. 9 da. $= 3.3$ mo.

$854.42 \times .06 = 51.2652$, int. of 1 yr.;
$51.2652 \div 12 = 4.2721$, int. of 1 mo.;
$4.2721 \times 3.3 = \$14.09793$, *Ans.*

(7)

$(1123.20 \times .06 \div 12) \times 11.2 = \$62.8992$, *Ans.*

(8)

$(2306.54 \times .05 \div 12) \times 7.9\frac{1}{3} = \$76.24393+$, *Ans.*

(9)

$(4272.10 \times .05 \div 12) \times 10.9\frac{1}{3} = \$194.61781+$, *Ans.*

(10)

(1620 × .04 ÷ 12) × 60.8 = $328.32, *Ans.*

(11)

(2430.72 × .04 ÷ 12) × 124 = $1004.6976, *Ans.*

(12)

(3689.45 × .07 ÷ 12) × 55 = $1183.69845, *Ans.*

(13)

(2945.96 × .07 ÷ 12) × 84.1 = $1445.23831+, *Ans.*

(14)

(675.89 × .08 ÷ 12) × 42.2 = $190.15024, *Ans.*

(15)

(648.54 × .04½ ÷ 12) × 90 = $218.88225, *Ans.*

(16)

(1297.10 × .05½ ÷ 12) × 101 = $600.44904, *Ans.*

(17)

(864.768 × .06¼ ÷ 12) × 9.8⅓ = $44.2893⅓, *Ans.*

(18)

(2594.20 × .07½ ÷ 12) × 10.3 = $167.001625, *Ans.*

(19)

(2376.84 × .08⅓ ÷ 12) × 45.4 = $749.36468, interest;
749.36468 + 2376.84 = $3126.20468+, *Ans.*

(20)

(5148.40 × .09½ ÷ 12) × 95.7⅔ = $3903.27312, interest;
3903.27312 + 5148.40 = $9051.67312, *Ans.*

(21)

$(3565.20 \times .10\frac{1}{2} \div 12) \times 45 = \$1403.7975$, interest;
$1403.7975 + 3565.20 = \$4968.9975$, *Ans.*

(22)

$(750 \times .07 \div 12) \times 6.4\frac{1}{3} = \$28.1458\frac{1}{3}$, interest;
$28.1458\frac{1}{3} + 750 = \$778.1458\frac{1}{3}$, *Ans.*

(23)

$(2560 \times .07 \div 12) \times 4.5 = \$67.20$, interest;
$2560 + 67.20 = \$2627.20$, cost;
$4250 - 2627.20 = \$1622.80$, gain, *Ans.*

(24)

$(5675 \times .06 \div 12) \times 45.7\frac{1}{3} = \$1297.68\frac{1}{3}$, interest;
$1297.68\frac{1}{3} + 5675 = \$6972.68\frac{1}{3}$, *Ans.*

(25)

$(4912 \times .07 \div 12) \times 5.5 = \$157.59331$, interest;
$4912 + 157.59331 = \$5069.59331$, cost;
$4912 \times 1.30 = \$6385.60$, selling price;
$6385.60 - 5069.59331 = \$1316.00669$, *Ans.*

(26)

$(256 \times .07\frac{1}{2} \div 12) \times 10.5 = \$16.80$, interest;
$256 + 16.80 = \$272.80$, *Ans.*

(27)

$$\begin{array}{rrr} \text{yr.} & \text{mo.} & \text{da.} \\ 1855 & 10 & 10 \\ 1852 & 1 & 1 \\ \hline 3 & 9 & 9, \text{ time.} \end{array}$$

$(264.42 \times .04 \div 12) \times 45.3 = \$39.92742$, *Ans.*

(28)

yr.	mo.	da.
1852	9	10
1850	4	6
2	5	4, time.

$(793.26 \times .07 \div 12) \times 29.1\frac{1}{3} = \$134.81013$, interest;
$793.26 + 134.81013 = \$928.07013$, *Ans.*

(29)

yr.	mo.	da.
1851	1	1
1850	6	7
	6	24, time.

$(512.50 \times .06 \div 12) \times 6.8 = \$17.425$, interest;
$512.50 + 17.425 = \$529.925$, *Ans.*

(30)

90 days = 3 months;
$(1250.75 \times .10 \div 12) \times 3 = \$31.26875$, *Ans.*

(31)

yr.	mo.	da.
1852	12	7
1848	2	8
4	9	29, time.

$(7109 \times .06\frac{3}{4} \div 12) \times 57.9\frac{2}{3} = \$2317.9783125$, interest;
$7109 + 2317.9783125 = \$9426.9783125$, *Ans.*

(32)

yr.	mo.	da.
1838	10	16
1836	5	19
2	4	27, less 3 mo. = 25.9 mo

$(213.27 \times .07 \div 12) \times 25.9 = \$32.22154\frac{1}{4}$, interest;
$213.27 + 32.22154\frac{1}{4} = \$245.49154\frac{1}{4}$, *Ans.*

(33)

yr.	mo.	da.
1839	2	2
1838	11	17
	2	15, time.

(2132.70 × .07½ ÷ 12) × 2.5 = $33.32343¾, *Ans.*

(34)

yr.	mo.	da.
1824	9	2
1815	4	27
9	4	5, time.

(38463 × .08 ÷ 12 × 112.1⅔ = $28761.776⅔, *Ans.*

(35)

yr.	mo.	da.
1845	4	30
1840	6	29
4	10	1, time.

(14231.50 × .08¼ ÷ 12) × 58.0⅓ = $5678.07186, *Ans.*

(36)

yr.	mo.	da.
1849	5	4
1843	9	4
5	8	0, time.

(426.40 × .09 ÷ 12) × 68 = $217.464, *Ans.*

(37)

yr.	mo.	da.
1818	1	22
1817	12	1
	1	21, time.

(4320 × .09½ ÷ 12) × 1.7 = $58.14, *Ans.*

(38)

yr.	mo.	da.
1835	3	31
1834	3	24
1	0	7, time.

(397.16 × .10½ ÷ 12) × 12.2⅓ = $42.51266, interest;
397.16 + 42.51266 = $439.67266, *Ans.*

(39)

yr.	mo.	da.
1855	3	24
1845	9	27
9	5	27, time.

(164.60 × .01½ ÷ 12) × 113.9 = $23.434925, interest;
164.60 + 23.434925 = $188.034925, *Ans.*

(1)

£67 19s. 6d. = £67.975.
(67.975 × .06 ÷ 12) × 44.5⅓ = £15.13576 =
£15 2s. 8d. 2far., *Ans.*

(2)

£127 15s. 4d. = £127.76666.
(127.76666 × .06 ÷ 12) × 39 = £24.914499 =
£24 18s. 3d. 1far., *Ans.*

(3)

£107 16s. 10d. = £107.84166.
(107.84166 × .07 ÷ 12) × 42.2 = £26.547023 =
£26 10s. 11d. 1far., *Ans.*

(4)

£279 13s. 8d. = £279.683333.

(279.683333 × .05¼ ÷ 12) × 42 = £51.39181, interest;

279.68333 + 51.39181 = £331.07514 = £331 1s. 6d., *Ans*

PARTIAL PAYMENTS.

(2)

Principal on interest, from Feb. 6, 1825,		$3469.3200
Interest to May 16, 1828, time of first payment, 3 yr. 3 mo. 10 da.,	$682.2996	
First payment is less than interest then due; take the interest on principal, from May 16, 1828, to May 16, 1830, 2 years,	416.3184	
Interest due,		1098.6180
Amount,		4567.9380
Since interest is less than the payments, we deduct from the amount the two payments,		1821.76
Sum due May 16, 1830, after payment,		2746.178
Interest of $2746.178 from May 16, 1830, to Feb. 1, 1831, 8 mo. 15 da.		116.7125
Amount,		2862.8905
Since this interest is less than payment, it is deducted from the amount,		2074.72
Sum due Feb. 1, 1831, after payment,		788.1705
Interest of $788.1705 from Feb. 1, 1831, to Aug. 11, 1832, 1 yr. 6 mo. 10 da.		72.2489
Amount due Aug. 11, 1832,		$860.4194

(3)

Principal on interest from Sept. 5, 1817, . . .	$635.84
Interest from Sept. 5, 1817, to Nov. 13, 1819, 2 yr. 2 mo. 8 da.	83.50698
Amount, ...	719.34698
Payment Nov. 13, 1819, ...	416.08
Remainder for new principal, ...	303.26698
Interest on $303.26698 from Nov. 13, 1819, to May 10, 1820, 5 mo. 27 da.	8.94637
Amount, ...	312.21335
Payment May 10, 1820, ...	152.00000
Remainder for new principal, ...	160.21335
Interest on $160.21335 from May 10, 1820, to March 1, 1821, 9 mo. 21 da.	7.77034
Amount due, ...	$167.98369

PROBLEMS IN INTEREST.

(2)

3675 × 3 = 11025; 771.75 ÷ 11025 = .07.

7 per cent., *Ans.*

(3)

459 × .08 = 36.72; 183.60 ÷ 36.72 = 5.

5 years, *Ans.*

(4)

3 × .06 = .18; 40.50 ÷ .18 = 225.

$225, *Ans.*

(5)

918 × .04 = 36.72; 269.28 ÷ 36.72 = 7⅓.

7 yr. 4 mo., *Ans.*

(6)

3 yr. 9 mo. = 3.75 yr.

3.75 × .07 = .2625; 396 ÷ .2625 = $1508.57142+, *Ans.*

(7)

10000 − 8762.50 = 1237.50, interest;

8762.50 × .07 = 613.375.

1237.50 ÷ 613.375 = 2 yr. 0 mo. 6.309 da., *Ans.*

(8)

2 yr. 3 mo. 15 da. = 2.291⅔ yr.

5620 × 2.291⅔ = 12879.166⅔;

1800 ÷ 12879.166⅔ = .13976, or 13.976 per cent., *Ans.*

(9)

15960.00 × .27 = 4309.20;

5 mo. 16 da. = .46111+ yr.;

15960 × .46111 = 7359.3156;

4309.20 ÷ 7359.3156 = .585+, or 58.5 per cent., *Ans.*

(10)

(350 × .08 ÷ 12) × 46.1⅔ = 107.72206, interest;

2 yr. 9 mo. 10 da. = 2.77777+ yr.

2.77777+ × .06 = .16⅔;

107.72206 ÷ .16⅔ = $646.33236, *Ans.*

(11)

(9625 × .06½ ÷ 12) × 53.6 = 2794.457976, interest;

5000 × .07 = 350;

2794.457976 ÷ 350 = 7.983308 =

7 yr. 11 mo. 23.99+, or 24 da., *Ans.*

COMPOUND INTEREST.

(2)

To multiply the principal by the rate, and to add the principal to the product, is equivalent to multiplying the principal by 1 + the rate; hence

$100 \times 1.06 \times 1.06 \times 1.06 = \$119.1016$, amount;
$119.1016 - 100 = \$19.1016$, interest, *Ans.*

(3)

$295.37 \times 1.06 \times 1.06 = \$331.8777$, amount;
$331.8777 - 295.37 = \$36.5077$, interest, *Ans.*

(4)

$1875 \times 1.05 \times 1.05 \times 1.05 \times 1.05 = \$2279.07421\frac{7}{8}$, amount;
$2279.07421\frac{7}{8} - 1875 = \$404.07421\frac{7}{8}$, interest, *Ans.*

(5)

$250 \times 1.08 \times 1.08 = \$291.60$, *Ans.*

(6)

$939.64 \times 1.07 \times 1.07 \times 1.07 = \$1151.09939$, amt. for 3 yr.
$(1151.09939 \times .07 \div 12) \times 9 = \$60.43271+$, int. for 9 mo
$1151.09939 + 60.43271 = \$1211.53210$, amt.
$1211.53210 - 939.64 = \$271.8921$, *Ans.*

(7)

$125.50 \times 1.04 \times 1.04 \times 1.04 \times 1.04 \times 1.04 \times 1.04 \times 1.04 \times 1.04 \times 1.04 \times 1.04 = \$185.77061+$, amount, *Ans.*

(8)

In 2 years there are 4 periods of 6 months each; 6 per cent. per annum = 3 per cent. per 6 months.

250 × 1.03 × 1.03 × 1.03 × 1.03 = \$281.3772, amount;
281.3772 − 250 = \$31.3772, interest, *Ans.*

(9)

500 × $1.02\frac{1}{2}$ × $1.02\frac{1}{2}$ × $1.02\frac{1}{2}$ = \$$538.44531\frac{1}{4}$, amount;
$538.44531\frac{1}{4}$ − 500 = \$$38.44531\frac{1}{4}$, interest, *Ans.*

(10)

1.7783163, amt. of \$1 for 8 yr. 6 mo.
1 7783163 × 96.50 = 171.60752, amt. of \$96.50 for 8 yr. 6 mo.

(11)

1.39509435, amt. of \$1 for 5 yr. 8 mo. 15 da.
1.39509435 × 300 = \$418.5283, amount;
418.5283 − 300 = \$118.5283, interest, *Ans.*

(12)

1.25219, amt. of \$1 for 3 yr. 3 mo. 24 da.;
1.25219 × 1250 = \$1565.2375, amount;
1565.2375 − 1250 = \$315.2375, interest, *Ans.*

DISCOUNT.

(1)

1.045, amt. of \$1 for 1 yr.
1828.75 ÷ 1.045 = \$1750, *Ans.*

(2)

1.055, amt. of \$1 for 11 mo.
1651.50 ÷ 1.055 = \$1565.40284, *Ans.*

(3)

1.03, amount of $1 for 6 mo.; 900 ÷ 1.03 = 873.78640
1.06, " " 12 mo.; 2700 ÷ 1.06 = 2547.16981
1.09, " " 18 mo.; 3900 ÷ 1.09 = 3577.98165
1.12, " " 2 yr.; 3000 ÷ 1.12 = 2678.57142
Ans. $9677.50928

900 + 2700 + 3900 = $7500; 10500 − 7500 = $3000.

(4)

2250 ÷ 1.035 = $2173.91304
2250 ÷ 1.07 = 2102.80373
Present value, $4276.71677

4500 − 4276.71677 = $223.28323, discount, *Ans.*

(5)

2880 ÷ 1.015 = $2837.43842
1920 ÷ 1.03 = 1864.07766
960 ÷ 1.045 = 918.66028
Present value, $5620.17636, *Ans*

(6)

360 ÷ $1.01\frac{2}{3}$ = $354.09836
360 ÷ $1.03\frac{1}{3}$ = 348.38709
Present value, $702.48545, *Ans.*

(7)

750 ÷ 1.0525 = $712.58907, present value;
750 − 712.58907 = $37.41093, discount;
(750 × .07 ÷ 12) × 9 = $39.3750, interest;
39.3750 − 37.41093 = $1.96407, difference, *Ans.*

(8)

4000 ÷ 1.03375 = $3869.40749, present value, *Ans.*

(9)

$$\text{From Sept. 25, 1862, to Jan. 11, 1863}\left\{\begin{array}{l}= \text{3 mo. 16 da.,}\\ \quad\text{time of discount}\end{array}\right.$$

$2146.50 \div 1.0176\frac{2}{3} \doteq \$2109.23681$, present value, *Ans.*

(10)

4 yr. 2 mo. 3 da., time of discount.

3456 ÷ 1.2505 = $2763.694, *Ans.*

(11)

4800 ÷ 1.20 = $4000, present value, *Ans.*

(12)

230 ÷ 1.0525 = $218.52731, present value of $230;

$$225 - 218.52731 = \$6.47269\left\{\begin{array}{l}\text{loss to the seller, or}\\ \quad\text{gain to the buyer.}\end{array}\right.$$

BANKING.

(1)

(350 × .07 ÷ 12) × 3.1 = $6.32916+, *Ans.*

(2)

(1000 × .06 ÷ 12) × 2.1 = $10.50, *Ans.*

(3)

(15720 × .06 ÷ 12) × 6.1 = $479.46, discount;

15720 − 479.46 = $15240.54, *Ans.*

(4)

(556.27 × .06 ÷ 12) × 2.1 = $5.840835, *Ans.*

(5)

$(3456 \times .07 \div 12) \times 3.1 = \$62.496$, discount;
$3456 - 62.496 = \$3393.504$, *Ans.*

(6)

$(367.47 \times .07 \div 12) \times 13.5\frac{1}{3} = \$29.0097$, *Ans.*

(7)

$(672.50 \times .06 \div 12) \times 5.1 = \$17.14875$, *Ans.*

(8)

$(1670 \times .07 \div 12) \times 8.1 = \$78.9075$, discount;
$1670 - 78.9075 = \$1591.0925$, *Ans.*

(9)

3 mo. 22 da., time of discount.
$(6579.15 \times .06 \div 12) \times 3.7\frac{1}{3} = \$122.81079$, *Ans.*

(1)

.8915, present value of \$1 for 1 yr. 6 mo. 18 da.
$307.27 \div .8915 = \$344.66629$, *Ans.*

(2)

$.9504\frac{1}{6}$, present value of \$1 for 8 mo. 15 da.
$5450 \div .9504\frac{1}{6} = \$5734.32704$, *Ans.*

(3)

5 mo 29 da., time of discount; $.9701\frac{2}{3}$, present value of \$1.
$674.89 \div .9701\frac{2}{3} = \$695.64336$, *Ans.*

(4)

$.96441\frac{2}{3}$, present value of \$1.
$1683.75 \div .96441\frac{2}{3} = \$1745.87401$, *Ans.*

(5)

.97608⅓, present value of $1.

367.464 ÷ .97608⅓ = $376.46785, *Ans.*

EXCHANGE.

(1)

The par value increased by the premium = market value.

3675 × 1.01¼ = $3720.9375, *Ans.*

(2)

8756.50 × .99 = $8668.935.

(3)

6584 × 1.02½ = $6748.60.

(4)

4653.75 × .98½ = $4583.94375.

(5)

3690 × .98¾ = $3643.875.

(6)

950.50 × 1.02⅕ = $971.411.

(7)

3950 ÷ 1.015 = $3891.62561.

(8)

762 × .00½ = 3.81, disc.; 762 − 3.81 = 758.19, par value.

758.19 ÷ 1.0175 = $745.14987, *Ans.*

FOREIGN BILLS.

(1)

100 × 450 = 45000 lb. of cotton;
7½ × 45000 = 337500d., cost;
337500d. = £1406.25;
1406.25 − 187.5 = £1218.75, net proceeds;
1218.75 × 1.09¾ × $\frac{40}{9}$ = $5944.7916⅔, *Ans.*

(2)

$450 \times 85 = 38250$ lb. of tobacco;

$38250 \times 12\frac{1}{2} = 478125$d., cost;

478125d. = £1992.1875;

$1992.1875 - 92.08333 =$ £1900.10416, net proceeds;

$1900.10416 \times 1.09\frac{1}{4} \times \frac{40}{9} = \$9266.06133+$, *Ans.*

EXCHANGE ON FRANCE.

(1)

$6530.00 \div 5.14 = \$1270.42801+$, *Ans.*

(2)

$10262 \div 5.09 = \$2016.11001+$, *Ans.*

(3)

$87595 \div 5.16 = \$16975.77519+$, *Ans.*

EQUATION OF PAYMENTS.

(1)

$$\begin{array}{rcl} 600 \times 12 & = & 7200 \\ 800 \times 6 & = & 4800 \\ \underline{900} \times 9 & = & \underline{8100} \\ 2300 & & 20100 \end{array}$$

$20100 \div 2300 = 8$ mo. $22\frac{4}{23}$ da., *Ans.*

(2)

$$\begin{array}{rcl} 200 \times 6 & = & 1200 \\ 150 \times 8 & = & 1200 \\ \underline{250} \times 12 & = & \underline{3000} \\ 600 & & 5400 \end{array}$$

$\frac{1}{3}$ of $600 = 200$

$\frac{1}{4}$ of $600 = 150$

Rem. $= 250$

$5400 \div 600 = 9$ mo., *Ans.*

(3)

$$\begin{array}{rcrcr} 300 & \times & 60 & = & 18000 \\ 500 & \times & 120 & = & 60000 \\ 750 & \times & 180 & = & 135000 \\ \hline 1550 & & & & 213000 \end{array}$$

213000 ÷ 1550 = 137$\frac{13}{31}$ da., *Ans*

(1)

$$\begin{array}{rcrcr} 1000 & \times & 0 & = & 0000 \\ 1500 & \times & 31 & = & 46500 \\ 3000 & \times & 59 & = & 177000 \\ 4000 & \times & 104 & = & 416000 \\ \hline 9500 & & & & 639500 \end{array}$$

639500 ÷ 9500 = 67$\frac{6}{19}$ da. from Jan. 1, or March 9, *Ans.*

(2)

The dates of payment are as follows:

$$\begin{array}{lrcrcr} \text{March 16 . .} & 3750 & \times & 0 & = & 0000 \\ \text{April 11 . .} & 3000 & \times & 26 & = & 78000 \\ \text{May 5 . .} & 2400 & \times & 50 & = & 120000 \\ \text{August 7 . .} & 2250 & \times & 144 & = & 324000 \\ \hline & 1140 & & & & 522000 \end{array}$$

522000 ÷ 11400 = 45$\frac{30}{38}$ da., or 46 days from March 16 or May 2. The note must be made payable on May 2, or on any other day with interest from May 2.

(3)

$$\begin{array}{llrcrcr} \text{Bought June 6 . .} & \text{Due Dec. 6 . .} & 650 & \times & 0 & = & 000 \\ \text{" July 8 . .} & \text{" Jan. 8 . .} & 890 & \times & 33 & = & 29370 \\ \text{" Aug. 1 . .} & \text{" Feb. 1 . .} & 7940 & \times & 57 & = & 452580 \\ \hline & & 9480 & & & & 481950 \end{array}$$

481950 ÷ 9480 = 50$\frac{795}{948}$ da., or 51 days = Jan. 26, *Ans.*

(4)

Bought	Jan. 2 ..	Due	May 2 ..	1275	× 0 =	00000
"	" 31 ..	"	" 31 ..	1600	× 29 =	46400
"	Feb. 5 ..	"	June 5 ..	595	× 34 =	20230
"	Mar. 19 ..	"	July 19 ..	675	× 78 =	52650
				4145		119280

119280 ÷ 4145 = $28\frac{644}{829}$ da., or 29 days from May 2 = May 31, *Ans.*

(5)

Bought	$\overset{1860}{\text{May}}$ 6 ..	Due	$\overset{1860}{\text{Nov.}}$ 6 ..	892	× 125 =	111500
"	June 19 ..	"	Dec. 19 ..	1063	× 168 =	178584
"	July 4 ..	"	$\overset{1861}{\text{Jan.}}$ 4 ..	2585	× 184 =	475640
				4540		765724

765724 ÷ 4540 = $168\frac{751}{1135}$ da., from July 4 = Dec. 20, 1860.

(2)

Dr.		
716	× 77 =	55132
595	× 72 =	42840
1697.75	× 43 =	73003.25
950	× 25 =	23750
176	× 19 =	3344
4134.75		198069.25

Cr.		
975	× 92 =	89700
1640	× 81 =	132840
500	× 45 =	22500
615	× 31 =	19065
3730		264105
		198069.25
		66035.75

66035.75 × $\frac{.07}{360}$ = 12.84, interest balance;
3730 + 12.84 = 3742.84;
4134.75 − 3742.84 = $391.91, cash balance, *Ans.*

ASSESSING TAXES.

(3)

$1500 \div 300000 = .005$, rate; $2450 \times .005 = \$12.25$, *Ans.*

(4)

$40 \times 5 = 200$; $200 + 42.68 = 242.68$;
$242.68 \div 121340 = .002$; $3125 \times .002 = \$6.25$, *Ans.*

CUSTOM-HOUSE BUSINESS.

(1)

$8 \times 48 \times 125 = 3600$ oz.; $3600 \div 16 = 1125$ lb.;
$2.50 \times 1125 = \$2812.50$, *Ans.*

(2)

$160 \times 225 = 36000$, gross; $36000 \times .02 = 720.00$ tare;
$36000 - 720 = 35280$, net weight; $35280 \times .06 = \$2116.80$;
20 per cent. of which is $423.36, *Ans.*

(3)

$2\frac{3}{4} \times 225 \times .95 \times .35 = \$251.45$, *Ans.*

(4)

$196 - 2 = 194$ lb.; $194 \times 174 = 33950$ lb.;
$33950 \times .85 \times .05 = \$1442.875$, *Ans.*

ANALYSIS.

(2)

$49 \div 7 = \$7$, cost of 1 yd.; $7 \times 16 = \$112$, *Ans.*
Or, $\frac{49}{7} \times 16 = 112$.

(3)

72 ÷ 12 = \$6, cost of 1 bbl.; 6 × 37 = \$222, *Ans.*

Or, $\frac{72}{12} \times 37 = 222$.

(4)

$\frac{70}{35} \times \frac{19}{2} =$ \$19, *Ans.*

(5)

$\frac{12 \times 6}{4} =$ 18 sheep, *Ans.*

(8)

3s. 9d. = 45d.; 45 × 18 = 810d.;

7s. 6d. = 90d. = 1 dollar; 810 ÷ 90 = \$9, *Ans.*

(9)

6s. 8d. = 80d.; 80 × 7½ = 600d.;

600 ÷ 72 = \$8.33⅓, *Ans.*

(10)

1s. 5d. = 17d.; 17 × 120 = 2040d.;

2040 ÷ 56 = \$36.42857, *Ans.*

(11)

2040 ÷ 96 = \$21.25, *Ans.*

(12)

2040 ÷ 72 = \$28.33⅓, *Ans.*

(13)

3s. 6d. = 42d.; $$\frac{\overset{21}{\cancel{42}} \times 75}{\underset{48}{\cancel{96}}} = \frac{1575}{48} = \$32.8125, \textit{ Ans.}$$

(14)

1s. 8d. = 20d.; $$\frac{\overset{5}{\cancel{20}} \times \overset{37}{\cancel{148}}}{\underset{\underset{6}{\cancel{24}}}{\cancel{96}}} = \frac{185}{6} = \$30.83\tfrac{1}{3}, \textit{ Ans.}$$

(15)

10s. 8d. = 128d.; $\frac{\overset{4}{\cancel{128}} \times 46\frac{1}{2}}{\underset{3}{\cancel{96}}} = \frac{186}{3} = \$62$, *Ans.*

(16)

3s. 4d. = 40d.; $\frac{\overset{4}{\cancel{40}} \times 7}{\underset{9}{\cancel{90}}} = \frac{28}{9} = \$3.11\frac{1}{9}$, *Ans.*

(17)

1s. 4d. = 16d., and 2s. 8d. = 32d.; $\frac{\overset{2}{\cancel{32}} \times 12}{\cancel{16}} = 24$ lb., *Ans.*

(18)

$$\frac{\cancel{12} \times \overset{25}{\cancel{100}} \times 9}{\underset{\underset{2}{\cancel{8}}}{\cancel{96}}} = \frac{225}{2} = \$112.50, \textit{ Ans.}$$

(19)

$$\frac{\cancel{9} \times 63 \times \cancel{4} \times 15}{\underset{\underset{2}{\cancel{8}}}{\cancel{72}}} = \frac{945}{2} = \$472.50, \textit{ Ans.}$$

(20)

7s 6d. = 90d.; 3s. 9d. = 45d.; $\frac{\cancel{45} \times \overset{6}{\cancel{12}}}{\underset{\cancel{2}}{\cancel{90}}} = 6$ days, *Ans.*

(22)

$$2\frac{4}{5} \div 5\frac{1}{3} = \frac{\overset{7}{\cancel{14}}}{5} \times \frac{3}{\underset{8}{\cancel{16}}} = \frac{21}{40}, \text{ cost of 1 bu.;}$$

$$\frac{21}{\underset{8}{\cancel{40}}} \times \frac{\overset{5}{\cancel{25}}}{2} = \frac{105}{16} = \$6.5625, \textit{ Ans.}$$

(23)

$\frac{1}{\underset{2}{\cancel{6}}}$ of $\frac{\cancel{3}}{7}$ of $\frac{\overset{2}{\cancel{4}}}{\cancel{5}}$ of $\frac{\overset{10}{\cancel{50}}}{1} = \frac{20}{7}$; $\frac{\overset{10}{\cancel{20}}}{\cancel{7}} \times \frac{\cancel{7}}{\cancel{2}} = \$10$, *Ans.*

(24)

$\frac{1}{2}$ of $\frac{3}{4} = \frac{3}{8}$; $\frac{5}{8} \div \frac{3}{8} = \frac{5}{\cancel{8}} \times \frac{\cancel{8}}{3} = \frac{5}{3}$, cost of 1 gal.;

$\frac{5}{3} \times \frac{11}{2} = \frac{55}{6} = \$9.166\frac{2}{3}$, *Ans.*

(25)

$\frac{1}{5}$ of $\frac{4}{7} = \frac{4}{35}$, value of 1 share;

$1200 \div \frac{4}{35} = \overset{300}{\cancel{1200}} \times \frac{35}{\cancel{4}} = \$10500$, *Ans.*

(27)

$\frac{1}{4}$ of $32 = \frac{32}{4} = 8 = \frac{1}{9}$ of number; $8 \times 9 = 72$, *Ans.*

(28)

$\frac{1}{7}$ of $63 = 9 = \frac{1}{12}$ of number; $9 \times 12 = 108$, *Ans.*

Or, $\frac{63}{1} \div \frac{7}{12} = \frac{\overset{9}{\cancel{63}}}{1} \times \frac{12}{\cancel{7}} = 108$, *Ans.*

(29)

$\frac{1}{7}$ of $196 = 28 = \frac{1}{11}$ of journey; $28 \times 11 = 308 =$ journey.

$$\left.\begin{aligned} \tfrac{196}{1} \div \tfrac{7}{11} = \tfrac{196}{1} \times \tfrac{11}{7} &= 308 \text{ miles,} \\ 308 - 196 &= 112 \text{ miles,} \end{aligned}\right\} \textit{Ans.}$$

(30)

$\frac{1}{3}$ of $420 = \$140$, $\frac{1}{4}$ of elder son's share;
$140 \times 4 = \$560$, elder son's share;
$560 \times 3 \times 3 = \$5040$, value of estate, *Ans.*

PROPORTIONS OF NUMBERS.

(32)

$10 \times 6 = 60$ days, the time 1 man can do it;

$\frac{1}{5}$ of $60 = 12$ days, *Ans.*

(33)

$16 \times 36 = 576$ days, the time 1 man can do it;

$576 \div 12 = 48$ days, *Ans.*

(34)

$7 \times 3 = 21$ days, the time of 1 pipe;

$21 \div 8 = 2\frac{5}{8}$ days, *Ans.*

(35)

$8 \times 15 = 120$ hours, the time of labor;

$120 \div 11 = 10\frac{10}{11}$ hours, *Ans.*

(37)

$9 \times 3 = 27$ sq. ft., square measure of cloth;

$27 \div 2\frac{3}{5} = 27 \times \frac{5}{13} = 10\frac{5}{13}$ ft., length, *Ans.*

(38)

$\frac{44}{1} \times \frac{5}{4} = 55$ sq. yd., square measure of carpet;

$\frac{55}{1} \div \frac{7}{8} = \frac{55}{1} \times \frac{8}{7} = \frac{440}{7} = 62\frac{6}{7}$ yd., *Ans.*

(39)

$\frac{42}{1} \times \frac{3}{2} = 63$ sq. ft., square measure of paper;

$63 \div 2 = 31\frac{1}{2}$ ft. $= 10\frac{1}{2}$ yd., *Ans.*

(40)

$5.1 \times 1.25 = 6.375$ sq. yd. in cloak;

$6.375 \div \frac{5}{8} = 6.375 \times \frac{8}{5} = 10.2$ yd., *Ans.*

(42)

$\frac{1}{5}$ of 96 lb. $= \frac{96}{5}$, for 1 man for 15 days;
$\frac{1}{12}$ of $\frac{96}{5} = \frac{8}{5}$, for 1 man for 1 day;
$\frac{8}{5} \times 19 = \frac{152}{5}$, for 19 men for 1 day;
$\frac{57}{1} \div \frac{152}{5} = \frac{57}{1} \times \frac{5}{152} = 1\frac{7}{8}$ days, *Ans.*

(43)

$\frac{1}{16}$ of $\frac{1}{10}$ of $220 = \frac{11}{6}$ mi. traveled in 1 hour;
$\frac{11}{6} \times 16 = \frac{88}{3}$ mi. in 16 hours;
$\frac{880}{1} \div \frac{88}{3} = \frac{880}{1} \times \frac{3}{88} = 30$ days, *Ans.*

(44)

$$\frac{\overset{\overset{3}{\cancel{15}}}{\cancel{135}} \times 8 \times 4}{\cancel{9} \times \cancel{5}} = \$96, \textit{ Ans.}$$

(45)

$$\frac{200}{1} \div \frac{80 \times 25}{12 \times 6} = \frac{\overset{\cancel{8}}{\cancel{200}}}{1} \times \frac{\overset{6}{\cancel{12}} \times 6}{\underset{\underset{5}{\cancel{10}}}{\cancel{80}} \times \cancel{25}} = 7\tfrac{1}{5} \text{ days, } \textit{Ans.}$$

(46)

$$\frac{1}{\cancel{4}} \text{ of } \frac{1}{\cancel{3}} \text{ of } \frac{\overset{\overset{2}{\cancel{6}}}{\cancel{24}}}{1} = \$2, \text{ wages of 1 man for 1 day;}$$

$96 \div 2 \times 16 = 3$ men, *Ans.*

(47)

9 ft. of wall are finished; $27 - 9 = 18$ ft. unfinished.

$$\frac{1}{\underset{4}{\cancel{12}}} \text{ of } \frac{1}{\underset{2}{\cancel{6}}} \text{ of } \frac{\overset{\cancel{3}}{\cancel{9}}}{1} = \frac{1}{8}, \text{ 1 day's work of 1 man;}$$

$\frac{18}{1} \div \frac{1}{8} \times 4 = \frac{18}{1} \times \frac{8}{4} = 36$ men, *Ans.*

(49)

The flour would have supplied 1 person for 12 months;

1st person used $\frac{2}{12}$ flour, and must pay $\frac{1}{6}$ of $15 = \$2.50$
2d " " $\frac{3}{12}$ " " " $\frac{1}{4}$ of $15 = 3.75$
3d " " $\frac{7}{12}$ " " " $\frac{7}{12}$ of $15 = 8.75$

(50)

They gained in proportion to the money put in;

$875 + 625 = \$1500$; $\frac{875}{1500}$ of $300 = \$175$, 1st share;
$\frac{625}{1500}$ of $300 = \$125$, 2d share.

(51)

$$\begin{array}{r} 105 \\ 75 \\ 120 \\ \hline 300 \end{array}$$
300, No. of hogs.

$\frac{105}{300}$ of $\frac{60}{1} = 21$, A's loss;
$\frac{75}{300}$ of $\frac{60}{1} = 15$, B's loss;
$\frac{120}{300}$ of $\frac{60}{1} = 24$, C's loss.

(52)

$$\begin{array}{r} 75 \\ 150 \\ 100 \\ \hline 325 \end{array}$$
325, sum due.

$\frac{75}{325}$ of $\frac{50}{1} = 11\frac{7}{13}$, A's share;
$\frac{150}{325}$ of $\frac{50}{1} = 23\frac{1}{13}$, B's share;
$\frac{100}{325}$ of $\frac{50}{1} = 15\frac{5}{13}$, C's share.

(54)

A can build $\frac{1}{6}$ of the shed in 1 day;
B can build $\frac{1}{5}$ of it in 1 day;
Both can build $\frac{1}{6} + \frac{1}{5} = \frac{11}{30}$ in 1 day;
$1 \div \frac{11}{30} = \frac{30}{11} = 2\frac{8}{11}$ days, *Ans.*

(55)

The father earns $\frac{1}{9}$ of the sum in 1 day, and the son $\frac{1}{15}$;
Both earn $\frac{1}{9} + \frac{1}{15} = \frac{8}{45}$; $1 \div \frac{8}{45} = \frac{45}{8} = 5\frac{5}{8}$ days, *Ans.*

(56)

The two laborers dig $\frac{1}{16}$ trench in 1 day, and one digs $\frac{1}{25}$ in 1 day; the second digs in 1 day $\frac{1}{16} - \frac{1}{25} = \frac{9}{400}$;

$$1 \div \frac{9}{400} = \frac{400}{9} = 44\frac{4}{9} \text{ days, } \textit{Ans.}$$

(57)

A builds $\frac{1}{16}$ and B $\frac{1}{21}$ of the wall in 1 day; both build $\frac{1}{16} + \frac{1}{21} = \frac{37}{336}$; $\frac{37}{336} \times 5 = \frac{185}{336}$ in 5 days;

$$1 - \frac{185}{336} = \frac{151}{336}, \text{ what remains to be built;}$$

$$\frac{151}{336} \div \frac{1}{16} = \frac{151}{\underset{21}{\cancel{336}}} \times \frac{\cancel{16}}{1} = \frac{151}{21} = 7\frac{4}{21} \text{ days, } \textit{Ans.}$$

(58)

A does in 1 day $\frac{1}{18}$, and B in 1 day $\frac{1}{24}$; both do $\frac{1}{18} + \frac{1}{24} = \frac{7}{72}$; $\frac{1}{18} \times 6 = \frac{1}{3}$, what A does in 6 days, leaving $\frac{2}{3}$ of the wall to be built;

$$\frac{2}{3} \div \frac{7}{72} = \frac{2}{\cancel{3}} \times \frac{\overset{24}{\cancel{72}}}{7} = \frac{48}{7} = 6\frac{6}{7} \text{ da.;} \quad 6 + 6\frac{6}{7} = 12\frac{6}{7} \text{ da., } \textit{Ans.}$$

(59)

$\frac{1}{6} + \frac{1}{8} = \frac{7}{24}$ bbl., quantity used by both families in 1 week;

$$\frac{1}{2} \div \frac{7}{24} = \frac{1}{\cancel{2}} \times \frac{\overset{12}{\cancel{24}}}{7} = \frac{12}{7} = 1\frac{5}{7} \text{ week, } \textit{Ans.}$$

(60)

$\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{5}$ are the proportional numbers;

$\frac{1}{2} + \frac{1}{4} + \frac{1}{5} = \frac{10}{20} + \frac{5}{20} + \frac{4}{20} = \frac{19}{20}$; of which sum, the first number is $\frac{10}{19}$, the second is $\frac{5}{19}$, and the third is $\frac{4}{19}$;

$\frac{10}{19}$ of 500 = \$263.1578+; $\frac{5}{19}$ of 500 = \$131.5789+;

$\frac{4}{19}$ of 500 = \$105.2631+.

(61)

The second has the least part: suppose him to have one part; the first will have 2 such parts, and the third 6 such parts; and there will be altogether 9 such parts; therefore, the first will have

$\frac{2}{9}$ of 176.40 = \$39.20;

the 2d will have $\frac{1}{9}$ of 176.40 = \$19.60;

and the 3d will have $\frac{6}{9}$ of 176.40 = \$117.60.

(62)

The second lot cost \$150 more than the first; the third lot cost \$500 more than the first; the second and third cost \$650 more than the first.

If \$650 be taken from \$6000, then each lot cost an equal part, or $\frac{1}{3}$ of the remainder; $6000 - 650 = 5350$;

$\frac{1}{3}$ of 5350 = \$$1783.33\frac{1}{3}$, cost of 1st lot;

$1783.33\frac{1}{3} + 150 =$ \$$1933.33\frac{1}{3}$, cost of 2d lot;

$1783.33\frac{1}{3} + 500 =$ \$$2283.33\frac{1}{3}$, cost of 3d lot.

(64)

$75 \times 4 = 300$ $\frac{300}{900}$ of 175 = \$$58.33\frac{1}{3}$, A's share.

$100 \times 6 = \underline{600}$ $\frac{600}{900}$ of 175 = \$$116.66\frac{2}{3}$, B's share.

900

(65)

$4 \times 3 = 12$ $\frac{12}{29}$ of 580 = \$240, 1st man's share.

$5 \times 2 = 10$ $\frac{10}{29}$ of 580 = \$200, 2d " "

$7 \times 1 = \underline{7}$ $\frac{7}{29}$ of 580 = \$140, 3d " "

29

ALLIGATION.

(1)

$$\begin{array}{r}
30 \times 5 = 150 \\
72 \times 3 = 216 \\
\underline{60} \times 2 = \underline{120} \\
162 \qquad\quad 486
\end{array}$$

486 ÷ 162 = 3s., *Ans.*

(2)

$$\begin{array}{r}
15 \times 1.00 = 15.00 \\
\underline{25} \times .75 = \underline{18.75} \\
40 \qquad\qquad 33.75
\end{array}$$

33.75 ÷ 40 = .84$\frac{3}{8}$, *Ans.*

(3)

$$\begin{array}{r}
40 \times .81 = 12.40 \\
\underline{3} \times 0 = \underline{0.00} \\
43 \qquad\qquad 12.40
\end{array}$$

12.40 ÷ 43 = .28$\frac{36}{43}$, *Ans.*

(4)

$$\begin{array}{r}
22 \times 24 = 528 \\
20 \times 6 = 120 \\
16 \times \underline{6} = \underline{96} \\
36 \qquad 744
\end{array}$$

744 ÷ 36 = 20$\frac{2}{3}$, *Ans*

(5)

$$\begin{array}{r}
3 \times 64 = 192 \\
3 \times 74 = 222 \\
3 \times 84 = 252 \\
\underline{3} \times 70 = \underline{210} \\
12 \qquad\qquad 876
\end{array}$$

876 ÷ 12 = 73°, *Ans.*

ALLIGATION ALTERNATE.

(1)

		G.	L.	U.	Bal.
32	24	8		1	1
	30	2		1	1
	33		1	1	6
	36		4	1	1
		10	5		

10 − 5 = 5; 5 ÷ 1 = 5.

1 lb. at 24; 1 lb. at 30; 6 lb. at 33; 1 lb. at 36.

(2)

		G.	L.	U.	Bal.
24	16	8		1	1
	20	4		1	1
	28		4	1	3
		12	4		

12 − 4 = 8; 8 ÷ 4 = 2.

1 lb. at 16; 1 lb. at 20; 3 lb. at 28.

(3)

		G.	L.	U.	Bal.	P. P.
21	16	5		1	1	2
	18	3		1	1	2
	23		2	1	2½	5
	24		3	1	1	2
		8	5			

8 − 5 = 3; 3 ÷ 2 = 1½.

2 parts of 16, 2 of 18, 5 of 23, and 2 of 24.

(4)

		G.	L.	U.	Bal.	
18	10	8		1	1	at 10.
	14	4		1	1	" 14.
	21		3	1	2	" 21.
	24		6	1	1	" 24.
		12	9			

12 − 9 = 3; 3 ÷ 3 = 1.

(5)

		G.	L.	U.	Bal.	
2	0	2		1	2	gal. water.
	3		1	1	1	" wine, at $3.
	5		3	1	1	" wine, at $5.
		2	4			

4 − 2 = 2; 2 ÷ 2 = 1.

(1)

		G.	L.	U.	Bal.	
64	48	16		1	1	× 4 = 4.
	60	4		1	1	× 4 = 4.
	66		2	1	6	× 4 = 24.
	72		8	1	1	× 4 = 4.
		20	10			

20 − 10 = 10; 10 ÷ 2 = 5; 4 ÷ 1 = 4 = ratio.

(2)

		G.	L.	U.	Bal.	P. P.
64	36	28		1	$1\frac{5}{7}$	12 × 2 = 24.
	48	16		1	1	7 × 2 = 14.
	72		8	1	1	7 × 2 = 14.
	120		56	1	1	7 × 2 = 14.
		44	64			

64 − 44 = 20; 20 ÷ 28 = $\frac{5}{7}$; 14 ÷ 7 = 2.

(3)

		G.	L.	U.	Bal.	
42	18	24		1	1	× 12 = 12.
	24	18		1	1	× 12 = 12.
	36	6		1	1	× 12 = 12.
	48		6	1	8	× 12 = 96.
		48	6			

48 − 6 = 42; 42 ÷ 6 = 7; 12 ÷ 1 = 12.

(4)

		G.	L.	U.	Bal.	P. P.
8	4	4		1	1	4 × 8 = 32.
	7	1		1	1	4 × 8 = 32.
	12		4	1	$1\frac{1}{4}$	5 × 8 = 40.
		5	4			

5 − 4 = 1; 1 ÷ 4 = $\frac{1}{4}$; 40 ÷ 5 = 8.

(1)

		G.	L.	U.	Bal.	
8	4	4		1	1	× 36 = 36.
	6	2		1	1	× 36 = 36.
	10		2	1	1	× 36 = 36.
	12		4	1	1	× 36 = 36.
		6	6		4	

6 − 6 = 0; 144 ÷ 4 = 36.

(2)

		G.	L.	U.	Bal.	
7	5	2		1	1	× $21\frac{3}{4}$ = $21\frac{3}{4}$.
	6	1		1	1	× $21\frac{3}{4}$ = $21\frac{3}{4}$.
	8		1	1	1	× $21\frac{3}{4}$ = $21\frac{3}{4}$.
	9		2	1	1	× $21\frac{3}{4}$ = $21\frac{3}{4}$.
		3	3		4	

87 ÷ 4 = $21\frac{3}{4}$.

(3)

		G.	L.	U.	Bal.	P. P.	
17	15	2		1	$7\frac{1}{2}$	15	× 2 = 30.
	20		3	1	1	2	× 2 = 4.
	22		5	1	1	2	× 2 = 4.
	24		7	1	1	2	× 2 = 4.
		2	15			21	

15 − 2 = 13; 13 ÷ 2 = $6\frac{1}{2}$; 42 ÷ 21 = 2.

INVOLUTION.

(1)

$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$, *Ans.*

(2)

$\frac{1}{8} \times \frac{1}{8} \times \frac{1}{8} = \frac{1}{512}$, *Ans*

(3)

12 × 12 × 12 = 1728, *Ans.*

(4)

125 × 125 × 125 = 1953125, *Ans.*

(5)

9 × 9 × 9 × 9 = 6561, *Ans.*

(6)

$16 \times 16 \times 16 \times 16 \times 16 = 1048576$, *Ans.*

(7)

$225 \times 225 = 50625$, *Ans.*

(8)

$321 \times 321 \times 321 = 33076161$, *Ans.*

(9)

$215 \times 215 \times 215 \times 215 = 2136750625$, *Ans.*

(10)

$36049 \times 36049 = 1299530401$, *Ans.*

(11)

$.25 \times .25 \times .25 = .015625$, *Ans.*

(12)

$8.628 \times 8.628 \times 8.628 \times 8.628 = 5541.668535603456$, *Ans*

EVOLUTION.

(2)

$\sqrt{36729} = 191.64+$, *Ans.*

(3)

$\sqrt{2125} = 46.0977+$, *Ans.*

(4)

$\sqrt{26883881} = 5184.966+$, *Ans.*

(5)

$\sqrt{426409} = 653$, *Ans.*

(6)

$\sqrt{2976412} = 1725.228+$, *Ans.*

(7)

$\sqrt{91874261} = 9585.1062+$, *Ans.*

(1)

$\sqrt{3} = 1.73205+$, *Ans.*

(2)

$\sqrt{11} = 3.31662+$, *Ans*

(3)

$\sqrt{1069} = 32.695+.$

(4)

$\sqrt{2268741} = 1506.23+.$

(5)

$\sqrt{7596796} = 2756.22+.$

(6)

$\sqrt{36372961} = 6031.$

(7)

$\sqrt{22071204} = 4698.$

(8)

$\sqrt{3271.4207} = 57.1963+.$

(9)

$\sqrt{4795.25731} = 69.247+.$

(10)

$\sqrt{4.372594} = 2.09107+.$

(11)

$\sqrt{.0025} = .05.$

(12)

$\sqrt{.00032754} = .01809+.$

(13)

$\sqrt{.00103041} = .0321.$

(14)

$\sqrt{4.426816} = 2.104.$

(15)

$\sqrt{8\frac{3}{6}} = \sqrt{8.5} = 2.91547+$, *Ans.*

(16)

$\sqrt{9\frac{3}{4}} = \sqrt{9.75} = 3.12249+$, *Ans.*

(17)

$\sqrt{\frac{64}{125}} = \sqrt{.512} = .71554+$, *Ans.*

(18)

$\sqrt{\frac{125}{729}} = \sqrt{.17146776} = .41408+$, *Ans.*

(19)

$$\sqrt{\frac{2304}{5184}} = \frac{\sqrt{2304}}{\sqrt{5184}} = \frac{48}{72} = \frac{2}{3}, \textit{ Ans.}$$

(20)

$$\sqrt{\frac{2704}{4225}} = \frac{\sqrt{2704}}{\sqrt{4225}} = \frac{52}{65} = \frac{4}{5}, \textit{ Ans.}$$

APPLICATIONS IN SQUARE ROOT.

(2)

The rafter is the hypothenuse of a right-angled triangle, whose base is $\frac{1}{2}$ of 40 ft. = 20 ft., and perpendicular 15 ft.; hence

$$\overline{15}^2 + \overline{20}^2 = \overline{\text{hypothenuse}}^2 = 625;$$

$$\sqrt{625} = 25 = \text{length of rafter, } \textit{Ans.}$$

(1)

1 A. = 160 sq. rd.; $\sqrt{160} = 12.649+$, *Ans.*

(2)

100 A. = 16000 sq. rd.; $\sqrt{16000} = 126.491+$, *Ans.*

(3)

$\sqrt{7225} = 85$ men, *Ans.*

(4)

$\overline{50}^2 + \overline{84}^2 = \overline{\text{dist.}}^2 = 9556$; $\sqrt{9556} = 97.754+$mi., *Ans*

(5)

$\sqrt{12}$ A. = $\sqrt{1920}$ sq. rd. = 43.817+, *Ans.*

(6)

$\sqrt{6724} = 82$, *Ans.*

(7)

$\sqrt{3844} = 62$, *Ans.*

(8)

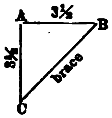
$\sqrt{10}$ A. $= \sqrt{1600}$ sq. rd. $= 40$; 40×4 sides $= 160$, *Ans.*

(9)

$\overline{150}^2 - \overline{120}^2 = \overline{\text{width of street}}^2 = 8100$; $\sqrt{8100} = 90$, *Ans.*

(10)

$3\frac{1}{2} = \frac{7}{2}$;



$\left(\frac{7}{2}\right)^2 + \left(\frac{7}{2}\right)^2 = \overline{\text{brace}}^2 = \frac{49}{4} + \frac{49}{4} = \frac{98}{4} = 24.5$;

$\sqrt{24.5} = 4.949+$, *Ans.*

CUBE ROOT.

(1)

$\sqrt[3]{389017} = 73$, *Ans.*

(2)

$\sqrt[3]{5735339} = 179$, *Ans.*

(3)

$\sqrt[3]{32461759} = 319$, *Ans.*

(4)

$\sqrt[3]{84604519} = 439$, *Ans*

(1)

$\sqrt[3]{.157464} = .54$, *Ans.*

(2)

$\sqrt[3]{.870983875} = .955$, *Ans.*

(3)

$\sqrt[3]{12.977875} = 2.35$, *Ans.*

(4)

$\sqrt[3]{.751089429} = .909$, *Ans.*

(5)

$\sqrt[3]{.353393243} = .707$, *Ans.*

(6)

$\sqrt[3]{3.408862625} = 1.505$, *Ans.*

(1)

$$\sqrt[3]{\tfrac{250}{686}} = \sqrt[3]{\tfrac{125}{343}} = \tfrac{5}{7}, \textit{ Ans.}$$

(2)

$$\sqrt[3]{31\tfrac{15}{343}} = \sqrt[3]{\tfrac{10648}{343}} = \tfrac{22}{7} = 3\tfrac{1}{7}, \textit{ Ans.}$$

(3)

$$\sqrt[3]{\tfrac{324}{1500}} = \sqrt[3]{\tfrac{27}{125}} = \tfrac{3}{5}, \textit{ Ans.}$$

(4)

$$\sqrt[3]{\tfrac{4}{7}} = \sqrt[3]{.571428571} = .829+, \textit{ Ans.}$$

(5)

$$\sqrt[3]{\tfrac{5}{9}} = \sqrt[3]{.555555555} = .822+, \textit{ Ans.}$$

(6)

$$\sqrt[3]{\tfrac{2}{3}} = \sqrt[3]{.666666666} = .873+, \textit{ Ans.}$$

APPLICATIONS.

(1)

$$\sqrt[3]{4913} = 17 \text{ ft.}, \textit{ Ans.}$$

(2)

$$\sqrt[3]{21952} = 28; \quad 28 \times 28 \times 6 = 4704, \textit{ Ans.}$$

(3)

$$25 \times 20 \times 8\tfrac{1}{2} = 4250 \text{ cu. ft.} = \text{solid measure};$$

$$\sqrt[3]{4250} = 16.197+, \textit{ Ans.}$$

(4)

A bushel contains $2150\frac{2}{5}$ cu. in.;

$2150\frac{2}{5} \times 2500 = 5376000$ cu. in.;

$\sqrt[3]{5376000} = 175.17+$ in.;

$175.17+ \div 12 = 14.59+$ ft., *Ans.*

(5)

$2 \times 2 \times 2 = 8$ cu. ft.;

$1728 \times 8 = 13824$ cu. in. = large cube;

$2 \times 2 \times 2 = 8$ cu. in. = small cube;

$13824 \div 8 = 1728$, *Ans.*

(6)

$\sqrt[3]{1728} = 12$ ft., *Ans.*

(7)

$2 \times 2 = 4$ sq. ft.; $54 \times 4 = 216$ cu. ft.;

$\sqrt[3]{216} = 6$ ft., *Ans.*

(9)

$1436.7584 : 11494.0672 :: \overline{14}^3 = 2744 : x = 21952$;

$\sqrt[3]{21952} = 28$ in. = 2 ft. 4 in., *Ans.*

(10)

$32 : 2048 :: 6^3 = 216 : x = 13824$ cu. in.;

$\sqrt[3]{13824} = 24$ in. = 2 ft., *Ans.*

(11)

$8 : 1 :: \overline{24}^3 = 13824 : x = 1728$;

$\sqrt[3]{1728} = 12$ ft., *Ans*

ARITHMETICAL PROGRESSION.

(1)

3 = com. diff.; 50 = num. terms;
3 × 49 = 147; 147 + 6 = $1.53, *Ans.*

(2)

7 = com. diff.; 17 = terms; 100 = 1st term;
7 × 16 = 112; 112 + 100 = 212, *Ans.*

(3)

1 × 39 = 39; 1 + 39 = 40, *Ans.*

(4)

2 × 29 = 58; 60 − 58 = 2, *Ans.*

(5)

18 mo. = 1½ yrs. = com. diff.; 60 = 1st term;
35 = num. terms;
1½ × 34 = 51; 60 − 51 = 9 yr., *Ans.*

(1)

32 − 4 = 28; 28 ÷ 7 = 4, *Ans.*

(2)

58 − 3 = 55; 55 ÷ 11 = 5, *Ans.*

(3)

150 − 50 = 100; 100 ÷ 25 = 4 cts., *Ans.*

(2)

$1 =$ 1st term.

$\underline{12} =$ last term.

$13 =$ sum of extremes.

$6 =$ half num. terms.

$13 \times 6 = 78$, *Ans.*

(3)

$4 \times 8 = 32$; $2 + 32 = 34 =$ last term;

$(2 + 34) \times 4\frac{1}{2} = 162$, *Ans.*

(4)

$1 \times 14 = 14$; $2 + 14 = 16 =$ last term;

$(2 + 16) \times 7\frac{1}{2} = \$1.35$, *Ans.*

(5)

$\frac{1}{2} \times 24 = 12$; $1 + 12 = 13 =$ last term;

$(1 + 13) \times 12\frac{1}{2} = 175$, *Ans.*

(6)

$100 =$ num. terms; $2 =$ com. diff.; $2 =$ 1st term;

$2 \times 99 + 2 = 200 =$ last term;

$(200 + 2) \times 50 = 10100$ yd. $=$ 5 mi. 1300 yd., *Ans.*

GEOMETRICAL PROGRESSION.

(2)

$2 =$ ratio; $12 =$ num. terms; $2^{11} = 2048$;

$1 \times 2048 = 2048$ far. $=$ £2 2s. 8d., *Ans.*

(3)

$(\frac{1}{2})^8 = \frac{1}{256}$; $1024 \times \frac{1}{256} = 4$, *Ans.*

(4)

$3^9 = 19683$; $4 \times 19683 = 78732$, *Ans.*

(5)

10 = num. terms; 50 = 1st term; 2 = ratio;
$2^{9} = 512$; $512 \times 50 = 25600$, *Ans.*

(6)

2 = ratio; 12 = num. terms; 3 = 1st term;
$2^{11} = 2048$; $3 \times 2048 = \$61.44$, *Ans.*

(1)

$4375 \times 3 = 13125$; $13125 - 2 = 13123$;
$13123 \div 2 = 6561\frac{1}{2}$, *Ans.*

(2)

$2 \times \frac{1}{2} = 1$; $128 - 1 = 127$; $127 \div \frac{1}{2} = 254$, *Ans.*

(3)

$192 \times 2 = 384$; $384 - 3 = 381$; $381 \div 1 = 381$, *Ans.*

(4)

1s. = 1st term; 2 = ratio; $1 \times 2^{11} =$ 2048s. = 12th term;
$2048 \times 2 = 4096$; $4096 - 1 = 4095$;
$4095 \div 1 =$ 4095s. = £204 15s., *Ans.*

(5)

$1 \times 3^{9} = \$196.83$ = 10th term;
$19683 \times 3 = 59049$; $59049 - 1 = 59049$;
$59049 \div 2 = \$295.24$, *Ans.*

(6)

$150 \times 2^{5} = 4800$ = last term;
$4800 \times 2 - 150 = 9450$; $9450 \div 1 = 9450$, *Ans.*

MENSURATION.

(1)

40 × 10 = 400 sq. yd.

(2)

40 × 7½ = 300 sq. ch. = 30 A.

(3)

35 × 13 = 455 sq. rd. = 2 A. 3 R. 15 P., *Ans.*

(1)

33.08 × 33.08 = 1094.2864 sq. ch. = 109 A. 1 R. 28.5824 P.

(2)

27 × 27 = 729 sq. ch. = 72 A. 3 R. 24 P., *Ans.*

(3)

25 × 25 = 625 sq. rd. = 3 A. 3 R. 25 P., *Ans.*

(4)

40 × 20 = 800 sq. rd. = 5 A., *Ans.*

(5)

40 × 40 = 1600 sq. rd. = 10 A., *Ans.*

(6)

15 × 5 = 75 sq. ch. = 7 A. 2 R., *Ans.*

(7)

27 ch. = 108 rd.; 108 × 69 = 46 A. 2 R. 12 P., *Ans.*

(8)

360 ft. = 120 yd.;

271 × 120 = 32520 sq. yd. = 6 A. 2 R. 35 P. 1¼ sq. yd.

(1)

321.52 + 214.24 = 535.75;

$$\frac{535.75}{2} \times 171.16 = 45849.485 \text{ sq. ft., } \textit{Ans.}$$

(2)

12.41 + 8.22 = 20.63;

(20.63 ÷ 2) × 5.15 = 53.12225 sq. ch. = 5 A. 1 R. 9 956 P

(3)

25 ft. 6 in. + 18 ft. 9 in. = 44 ft. 3 in.;

(44 ft. 3 in. ÷ 2) × 10 ft. 5 in. = 230 sq. ft. 5′ 7″ 6‴.

(4)

20.5 + 12.25 = 32.75;

(32.75 ÷ 2) × 10.75 = 176.03125 sq. yd., *Ans.*

(5)

7.50 + 12.25 = 19.75;

(19.75 ÷ 2) × 15.40 = 152.075 sq. ch. = 15 A. 33.2 P.

(6)

20 + 32 = 52;

(52 ÷ 2) × 26 = 676 sq. ch. = 67 A. 2 R. 16 P.

(1)

4 × 3.1416 = 12.5664.

(2)

93 × 3.1416 = 292.1688.

(3)

20 × 3.1416 = 62.8320.

(4)

78.54 ÷ 3.1416 = 25.

(5)

11652.1944 ÷ 3.1416 = 3709, *Ans.*

(6)

6850 ÷ 3.1416 = 2180.41+, *Ans.*

(1)

$\frac{1}{2}$ of 6 = 3 = radius; 9 × 3.1416 = 28.2744, *Ans.*

(2)

5 = radius; 25 × 3.1416 = 78.54, *Ans.*

(3)

3.5 = radius; 12.25 × 3.1416 = 38.4846, *Ans.*

(4)

1.75 = radius; 3.0625 × 3.1416 = 9.62115 sq. ft.;

9.62115 ÷ 9 = 1.069+ sq. yd., *Ans.*

(1)

$\overline{12}^2 \times 3.1416 = 452.3904$, *Ans.*

(2)

$7^2 \times 3.1416 = 153.9384$, *Ans.*

(3)

$\overline{24}^2 \times 3.1416 = 1809.5616$, *Ans.*

(4)

$\overline{7912}^2 \times 3.1416 = 196663355.7504$, *Ans.*

(1)

$\overline{12}^2 \times 3.1416 \times 3 \div 6 = 904.7808$, *Ans.*

(2)

$4^2 \times 3.1416 \times 2 \div 3 = 33.5104$, *Ans.*

(3)

$\overline{14}^2 \times 3.1416 \times 7 \div 3 = 1436.7584$, *Ans.*

(4)

$6^2 \times 3.1416 \times 3 \div 3 = 113.0976$, *Ans.*

(1)

$35 \times 5 = 175$ ft. = perim.; $175 \times 26 = 4550$ sq. ft., *Ans.*

(2)

$15 \times 8 = 120$; $120 \times 12 = 1440$ sq. ft., *Ans.*

(1)

$\overline{15}^2 \times 20 = 4500$ cu. ft., *Ans.*

(2)

$\overline{24}^2 \times 24 = 13824$, *Ans.*

(3)

$3\frac{1}{6} \times 2\frac{2}{3} \times 2\frac{1}{2} = 21\frac{1}{9}$ cu. ft., *Ans.*

(4)

$1728 \times 21\frac{1}{9} \div 231 = 157\frac{213}{231}$, *Ans.*

(5)

$350 \times 10 = 3500$ cu. ft., *Ans.*

(1)

$20 \times 3.1416 \times 50 = 3141.6$, *Ans.*

(2)

14 ft. × 8 ft. 4 in. $= 14 \times 8\frac{1}{3} = 116.666+$, *Ans.*

(3)

$3.1416 \times 30 \times 60 = 5654.88$, *Ans.*

(1)

$\left(\frac{15}{2}\right)^2 \times 3.1416 \times 12 = 2120.58$ cu. ft., *Ans.*

(2)

$\overline{10}^2 \times 3.1416 \times 29 = 9110.64$, *Ans.*

(3)

$6^2 \times 3.1416 \times 30 = 3392.928$ cu. ft. = contents;
$3392.928 \times 1728 = 5862979.584$ cu. in.;
$5862979.584 \div 231 = 25380.864$ gal.;
$25380.864 \div 31\frac{1}{2} = 805.7417\frac{1}{7}$ bbl., *Ans.*

(4)

$8^2 \times 3.1416 \times 9 = 1809.5616$;
$1809.5616 \times 1728 \div 231 = 13536.4608$;
$13536.4608 \div 63 = 214.8644\frac{4}{7}$ hhd., *Ans.*

(5)

$\overline{25}^2 \times 3.1416 \times 15 = 29452.5$, *Ans.*

(1)

$95 \times 5 = 475$, *Ans.*

(2)

$260 \times 8 = 2080$, *Ans.*

(3)

$207 \times 6 = 1242$, *Ans.*

(4)

$403 \times 12 = 4836$, *Ans*

(5)

$270 \times 5\frac{1}{3} = 1440$, *Ans.*

(6)

$25 \times 12 = 300 =$ base; $300 \times 12 = 3600$, *Ans.*

(1)

$$\left(\left(\frac{5}{2}\right)^2 \times 3.1416 \times 10\right) \div 3 = 65.45,\ \textit{Ans.}$$

(2)

$$(9^2 \times 3.1416 \times 27) \div 3 = 2290.2264,\ \textit{Ans.}$$

(3)

$$(\overline{10}^2 \times 3.1416 \times 30) \div 3 = 3141.6,\ \textit{Ans.}$$

(4)

$$(5^2 \times 3.1416 \times 27) \div 3 = 706.86,\ \textit{Ans.}$$

(5)

$$\left(\left(\frac{15}{2}\right)^2 \times 3.1416 \times 12\right) \div 3 = 706.86,\ \textit{Ans.}$$

GAUGING.

(2)

$$38 - 32 = 6;\quad \tfrac{2}{3} \text{ of } 6 = 4;\quad 32 + 4 = 36 = \text{mean diam.};$$
$$\overline{36}^2 \times 42 \times 34 = 185.0688 \text{ gal.},\ \textit{Ans.}$$

(3)

$$35 - 30 = 5;\quad \tfrac{2}{3} \text{ of } 5 = 3\tfrac{1}{3};\quad 30 + 3\tfrac{1}{3} = 33\tfrac{1}{3} = \tfrac{100}{3};$$
$$\left(\frac{100}{3}\right)^2 \times 36 \times 34 = 136 \text{ gal.},\ \textit{Ans.}$$

(4)

$$\tfrac{2}{3} \text{ of } (38 - 34) = 2\tfrac{2}{3};\quad 34 + 2\tfrac{2}{3} = 36\tfrac{2}{3} = \tfrac{110}{3};$$
$$\left(\frac{110}{3}\right)^2 \times 40 \times 34 = 182.844\tfrac{4}{9} \text{ gal.},\ \textit{Ans.}$$

(5)

$\frac{1}{9}$ of 14 = $\frac{14}{9}$ = quantity running in per minute;
$\frac{49}{31}$ = quantity running out;
$\frac{14}{9} - \frac{49}{31} = \frac{74}{279}$ = quantity in tub per minute;
both the pipe and tap are open for 3 hours = 180 minutes;
$\frac{74}{279} \times 180 = 47\frac{23}{31}$ = quantity in tub in 3 hours;
$147 - 47\frac{23}{31} = 99\frac{8}{31}$ = quantity which the tub will yet hold;
when the tap is shut, $99\frac{8}{31} \div \frac{14}{9} = 63\frac{351}{434}$ minutes = the time in which the pipe will fill the remaining part of the tub;
$\frac{351}{434}$ min. = $\frac{351}{434} \times 60 = 48\frac{114}{217}$ sec.;
5 hr. + 63 min. + $48\frac{114}{217}$ sec. = 6 hr. 3 min. $48\frac{114}{217}$ sec., *Ans.*

PROMISCUOUS EXAMPLES.

(1)

1142 × 45 = 51390 ft. = 9.73295+ miles, *Ans.*

(2)

36 − 32 = 4 mi. = distance gained in 1 day;
4 × 19 = 76 mi., *Ans.*
36 + 32 = 68 mi. = distance apart in 1 day;
68 × 19 = 1292 mi., *Ans.*

(3)

One starts 8 hours in advance of the other and travels 24 mi.;
130 − 24 = 106 mi. yet to be traveled;
4 — 3 = 7 mi. = distance they approach each other per hour;
106 ÷ 7 = $15\frac{1}{7}$ hr. = time in which they will meet;
3 × $15\frac{1}{7}$ = $45\frac{3}{7}$; $45\frac{3}{7}$ + 24 = $69\frac{3}{7}$ mi. from New Haven.

(4)

2173 + 371 = $2544, B's debt; 2173 + 2544 = $4717, *Ans.*

(5)

$\frac{1}{43}$ of 4429 = 103; 240 − 103 = 137, *Ans.*

(6)

$\frac{1}{4} \div \frac{2}{3} = \frac{3}{8}$, *Ans.*

(7)

$24\frac{1}{2} - 6\frac{5}{8} = 17\frac{7}{8}$ yd., *Ans.*

(8)

$$\frac{2}{3} \text{ of } \frac{6\frac{4}{5}}{12} = \frac{3}{4} \text{ of } \frac{34}{60} = \frac{17}{40}; \quad \frac{1}{3} \text{ of } \frac{1\frac{7}{8}}{5} = \frac{1}{8};$$

$$\frac{17}{40} - \frac{1}{8} = \frac{12}{40} = \frac{3}{10}, \textit{ Ans.}$$

(9)

$3\frac{3}{8} + 7\frac{5}{6} = 11\frac{5}{24}$; $4 + 2\frac{11}{12} = 6\frac{11}{12}$;

$11\frac{5}{24} - 6\frac{11}{12} = 4\frac{7}{24}$, *Ans.*

(10)

2.26 ÷ .25 = 9.04, *Ans.*

(11)

$6.66\frac{2}{3} \times \frac{5}{8} = 4.16\frac{2}{3} = 4\frac{1}{6}$, *Ans.*

(12)

326 ÷ 13 = $\$25\frac{1}{13}$, cost of 1 package;

$25\frac{1}{13} \times 39 = \$978$, *Ans.*

(13)

7250 × 7.50 = $31.875, cost of lumber;

31.875 ÷ .625 = 51 bush., *Ans.*

(14)

5 cwt. 1 qr. 18 lb. + 6 cwt. 0 qr. 10 lb. = 11 cwt. 2 qr. 3 lb. =

1153 lb.; 1153 × .07 = $80.71, *Ans.*

(15)

yr.	mo.	da.	hr.	
1855	4	20	10	
1854	9	4	15	
	7	15	19	= 5419 hr., *Ans.*

(16)

$\frac{5}{8} \div \frac{5}{6} = \frac{3}{4}$, price per gal.; $\frac{5}{9}$ of $\frac{63}{1} = 35$;
$\frac{3}{4} \times 35 = \$26.25$, *Ans.*

(17)

$\frac{1}{2}$ of $(425 + 1.625) = 213.3125$, greater number;
$\frac{1}{2}$ of $(425 - 1.625) = 211.6875$, less.

(18)

$\frac{1}{2}$ of $(\frac{6}{7} + \frac{1}{3}) = \frac{25}{42}$, greater number;
$\frac{1}{2}$ of $(\frac{6}{7} - \frac{1}{3}) = \frac{11}{42}$, less.

(19)

$5 \times 2 + 50 = 60$; $55 \times 2 = 110$; $110 - 60 = 50$, *Ans.*

(20)

$2637 \div .003 = 879000$, *Ans.*

(21)

$12 \times 6 = 72$; $12 \times 72 = 864$; $864 - 72 = 792$, *Ans.*

(22)

$28 \times 70 = 1960$ in. per minute;
$1960 \times 60 = 117600$ in. = 1 mi. 6 fur. 33 rd. $15\frac{1}{2}$ ft., *Ans.*

(23)

$1250 \times 4 = \$5000$, sons' share;
$1780 + 5000 = \$6780$, fortune;
$126 \times 25\frac{1}{2} = \$3213$, amount gained;
$6780 - 3213 = \$3567$, *Ans.*

(24)

15 in. = $1\frac{1}{4}$ ft.; $15 \times 1\frac{1}{4} = 18\frac{3}{4}$ sq. ft. in one plank;
$60\frac{1}{2} \times 33\frac{1}{2} = 2026\frac{3}{4}$ sq. ft. in floor;
$2026\frac{3}{4} \div 18\frac{3}{4} = 108\frac{7}{75}$ planks, *Ans.*

(25)

$18 \times 30 = 540$ sq. ft. in floor; $\frac{3}{4}$ yd. = $\frac{3}{4} \times 3 = \frac{9}{4}$ ft.;
$540 \div \frac{9}{4} = 240$ ft. = 80 yd., *Ans.*

(26)

$\frac{1}{8} + \frac{1}{6} = \frac{7}{24}$; $1 - \frac{7}{24} = \frac{17}{24}$ drilling = 85 men;
$85 \div \frac{17}{24} = 120$, *Ans.*

(27)

$\frac{3}{4}$ of $\frac{3}{5} = \frac{9}{20}$ sold for \$1710; $1710 \div \frac{9}{20} =$ \$3800, *Ans.*

(28)

$\frac{1}{2} + \frac{1}{4} + \frac{1}{6} = \frac{11}{12}$ = the apple, peach, and plum trees;
$1 - \frac{11}{12} = \frac{1}{12}$ = number of cherry and pear trees = 200;
$200 \times 12 = 2400$, *Ans.*

(29)

$140 + 300 + 160 =$ \$600;
$\frac{140}{600}$ of 120 = \$28, A's share;
$\frac{300}{600}$ of 120 = \$60, B's share;
$\frac{160}{600}$ of 120 = \$32, C's share.

(30)

$\frac{1}{2} + \frac{1}{4} + \frac{1}{6} = \frac{11}{12}$; $1 - \frac{11}{12} = \frac{1}{12}$ = D's share;
$\frac{1}{2}$ of 4728 = \$2364, A's share;
$\frac{1}{4}$ of 4728 = \$1182, B's share;
$\frac{1}{6}$ of 4728 = \$788, C's share;
$\frac{1}{12}$ of 4728 = \$394, D's share.

(31)

$\frac{1}{12}$ = what A can do in 1 day;

$\frac{1}{18}$ = what B can do in 1 day;

$\frac{1}{12}+\frac{1}{18}=\frac{18+12}{216}=\frac{30}{216}=\frac{5}{36}$ = what both can do in 1 day;

$1\div\frac{5}{36}=\frac{36}{5}=7\frac{1}{5}$ days, *Ans.*

(32)

$\frac{1}{7\frac{1}{2}}=\frac{2}{15}$ = what first family eats per month;

$\frac{1}{9}$ = what second family eats per month;

$\frac{1}{11\frac{1}{4}}=\frac{4}{45}$ = what third family eats per month;

$\frac{2}{15}+\frac{1}{9}+\frac{4}{45}=\frac{1}{3}$ = what the three families eat per month;

$1\div\frac{1}{3}=3$ months, *Ans.*

(33)

$\frac{2}{5}$ of $\frac{4}{9}$ of $\frac{3}{16}=\frac{1}{30}$; $\frac{3}{16}-\frac{1}{30}=\frac{37}{240}$ = what he had left; $\frac{3}{16}$ ship is worth \$1200; $1200\div\frac{3}{16}=\$6400$, value of ship; $\frac{37}{240}$ of $6400=\$986.66\frac{2}{3}$, what the remainder is worth, *Ans.*

(34)

$\frac{\cancel{2}}{\cancel{3}}$ of $\frac{4}{5}$ of $\frac{\cancel{3}}{\cancel{2}}=\frac{4}{5}$; $1\div\frac{4}{5}=\frac{5}{4}=1\frac{1}{4}$, *Ans.*

(35)

Let 1 denote the share of the first; then

$1+\frac{3}{4}+\frac{7}{8}=\frac{21}{8}$ = sum of shares;
the first part is $\frac{8}{21}$ of $420=160$;
the second part is $\frac{6}{21}=120$;
the third part is $\frac{7}{21}$ of $420=140$.

(36)

$4+6+7=17$ = sum of proportionate numbers;
1st share = $\frac{4}{17}$ of 10429.50 = \$2454;
2d share = $\frac{6}{17}$ of 10429.50 = \$3681;
3d share = $\frac{7}{17}$ of 10429.50 = \$4294.50.

(37)

$20 \times 52 \times 21 = 21840$s. $=$ £1092;
$1500 - 1092 =$ £408, saves, *Ans.*

(38)

$9 =$ num. terms; $3 =$ com. diff.; $19 =$ 1st term;
$8 \times 3 + 19 = 43$, last term, and age of the eldest daughter;
$43 + 19 = 62$ years, age of the mother, *Ans.*

(39)

$700 - 220 = 480$ yd. to be completed in $(29 - 11) = 18$ da.

The statement may read: "If 12 men can build 220 yards in 11 days, how many men can build 480 yards in 18 days." The difference in the number of men will be the number to be added.

In 1 day, one man will build $\frac{1}{12}$ of $\frac{1}{11}$ of 220 yd. $= \frac{20}{12}$ yd.;
In 18 days, one man will build $\frac{20}{12} \times 18 = \frac{60}{2} = 30$ yd.;
$480 \div 30 = 16$ men to do 480 yd. in 18 days;
$16 - 12 = 4$ men, *Ans.*

(40)

At the end of 5 months there are provisions to serve 360 men for 1 month; $\frac{1}{5}$ of $360 = 72$ men for 5 months; hence
$360 - 72 = 288$, number sent away, *Ans.*

(41)

$.92 \times 70 = \$64.40$; $1.37\frac{1}{2} \times 40 = \$55$;
$64.40 - 55 = \$9.40$; $9.40 \div .40 = 23\frac{1}{2}$ bu., *Ans.*

(42)

The provisions at the rate of 1 oz. per day, and for 1 week,
$1500 \times 12 \times 20 = 360000$ men;
at 8 oz. per day for 20 weeks, it will supply
$\frac{1}{8}$ of $\frac{1}{20}$ of $\frac{360000}{160} = 2250$ men, *Ans.*

(43)

$100 \times 50 = 5000$ sq. ft. $= 720000$ sq. in., surface of the yard;

$8 \times 4 = 32$ sq. in., surface of a brick;

$720000 \div 32 = 22500$, *Ans.*

(44)

12 yd. = 36 ft.; 2 yd. = 6 ft.; 6 in. = $\frac{1}{2}$ ft.;

$36 \times 6 \times 4 = 864$ cu. ft., solid measure of wall;

$2 \times 1 \times \frac{1}{2} = 1$ cu. ft., solid measure of a stone;

$864 \div 1 = 864$, number of stones, *Ans.*

(45)

To do 3 times as much work in the same time will require 3 times 20 men = 60 men; and to do this work in $\frac{1}{5}$ of the time will require 5 times 60 men = 300 men, *Ans.*

(46)

$$\overset{\text{men}}{12} : \overset{\text{men}}{19} :: \overset{\text{piece}}{12} \times \overset{\text{yd.}}{75} : \overset{\text{piece}}{x} \times \overset{\text{yd.}}{25};$$

$$x = \frac{19 \times 12 \times 75}{12 \times 25} = 57, \textit{ Ans.}$$

(47)

yr.	mo.	da.	hr.	min.
1854	9	21	16	30
1801	10	1	6	00
52	11	20	10	30, *Ans.*

(48)

$17 + 8 = 25$ yr., age of the father at birth of son;

$25 + 46 = 71$ yr., age of the father at death of son;

$71 + 40 = 111$ yr., *Ans.*

(49)

A can do $\frac{1}{10}$, and B $\frac{1}{13}$ of the work in 1 day;
Together they can do $\frac{1}{10} + \frac{1}{13} = \frac{23}{130}$;
It will take them as many days to do the whole as
$\frac{23}{130}$ is contained times in $1 = 5\frac{15}{23}$ days, *Ans.*

(50)

Denote the contents of the cask by 1.
The first will discharge $\frac{1}{60}$ of the contents in 1 minute;
the second, $\frac{1}{120}$; and the third, $\frac{1}{180}$;
The three running together will discharge $\frac{1}{60} + \frac{1}{120} + \frac{1}{180} =$
$\frac{11}{360}$ of the whole contents in 1 minute;
It will take as many minutes to empty the cask as
$\frac{11}{360}$ is contained times in 1; $1 \div \frac{11}{360} = 32\frac{8}{11}$ min., *Ans.*

(51)

$\frac{4}{5}$ of $\frac{5}{8} = \frac{1}{2}$; $\frac{5}{8} - \frac{1}{2} = \frac{1}{8}$, part sold;
5000 ÷ 1.15 = \$4347.826, cost of $\frac{1}{8}$ of the factory;
4347.826 × 8 = \$34782.608+, *Ans.*

(52)

1.04 = amount of \$1 for 8 months at 6 per cent;
35 ÷ 1.04 = \$33.6538, cash value;
33.6583 − 30 = \$3.6538+, *Ans.*

(53)

8s. 9d. = £.4375; .4375 ÷ 1.12 = £.390625, cost;
10s. 6d. = £.525; .525 − 390625 = £.134375, gain;
.134375 ÷ .390625 = £.344, or $34\frac{4}{10}$ per cent., *Ans.*

(54)

$.08\frac{1}{2} + .00\frac{1}{4} = .08\frac{3}{4}$; $8500 \div 1.08\frac{3}{4} =$ \$7816.09195, *Ans.*

(55)

$$\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} = \frac{77}{60};$$

Then the whole is to be divided into 77 parts, of which A to have 30, B, 20, C, 15, and D, 12;

$\frac{30}{77}$ of 500 = \$194.80$\frac{40}{77}$, A's share;
$\frac{20}{77}$ of 500 = \$129.87$\frac{1}{77}$, B's share;
$\frac{15}{77}$ of 500 = \$97.40$\frac{20}{77}$, C's share;
$\frac{12}{77}$ of 500 = \$77.92$\frac{16}{77}$, D's share.

(56)

If the first gave \$1, the second gave \$3, and the third \$6; and the three gave \$10; therefore, the first $\frac{1}{10}$, the second $\frac{3}{10}$, and the third $\frac{6}{10}$ of \$9202;

First, \$920.20; second, \$2760.60; third, \$5521.20, *Ans.*

(57)

$\frac{1}{15}$ would be filled in 1 hour, and $\frac{1}{16}$ emptied in 1 hour;

$\frac{9}{15} - \frac{1}{16} = \frac{1}{240}$ filled in 1 hour;

It would take as many hours to fill the vessel as $\frac{1}{240}$ is contained times in 1; $1 \div \frac{1}{240} = 240$ hr., *Ans.*

(58)

$$\frac{1}{40} + \frac{1}{50} = \frac{9}{200};$$

$\frac{9}{200} - \frac{1}{25} = \frac{1}{200}$ of the cistern filled in 1 minute;

$1 \div \frac{1}{200} = 200$ min. to fill the cistern = 3 hr. 20 min., *Ans*

(59)

$\overline{25}^2 + \overline{12}^2 = 769$; $\sqrt{769} = 27.7308$ ft., *Ans.*

(60)

58 − 3 = 55; 55 ÷ (12 − 1) = 5 yr., *Ans.*

(61)

3^9 = 19683; 1 × 19683 = 196.83 = last term;
(196.83 × 3) − 1 = 590.48;
590.48 ÷ (3 − 1) = $295.24, *Ans.*

(62)

		G.	L.	U.	Bal.	
42	18d.	24		1	1	× 12 = 12.
	24d.	18		1	1	× 12 = 12.
	36d.	6		1	1	× 12 = 12.
	48d.		6	1	8	× 12 = 96.
		48	6			

48 − 6 = 42; 42 ÷ 6 = 7; 12 ÷ 1 = 12 = ratio.

(63)

1 sq. ft. = 144 sq. in.; 144 ÷ 8½ = $16\frac{16}{17}$ in., *Ans.*

(64)

Interest of $2500 for 4 yr. 9 mo., at 6 per cent. = $712.50
Interest of $1250 for 9 yr. 6 mo., at 3 per cent. = 356.25
Ans. $356.25

(65)

9676.80 ÷ 1.12 = $8640, *Ans.*

(66)

2852.42 − 2377.50 = $474.92, interest;
474.92 ÷ 2377.50 × .04 = 4 yr. 11 mo. 27 da.+, *Ans.*

(67)

3600 × 1.50 + 3000 = $8400, amount invested;
8400 × .10 + 180.66 = $1020.66, *Ans.*

(68)

Interest from Sept. 5, 1837, to March 1, 1841, time being 3 yr. 5 mo. 26 da., ...		$1643.484
		7851.04
Amount, ...		$9494.524
Nov. 13, 1839, ...	paid $416.98	
May 10, 1840, ...	" 152.00	
		568.98
Due March 1, 1841, ...		$8925.544+

(69)

Since 1 lemon is worth 2 cts., 84 lemons are worth 168 cts.; 70 oranges are worth 168 cts., and 50 oranges are worth $\frac{5}{7}$ of 168 = 120 cts. = price of 1 lb. of tea, *Ans.*

(70)

160 oranges will cost 80d.;
180 " " " 60d.;
340 140d.

$2 \div 5 = \frac{2}{5}$d., cost of 1 orange; $\frac{2}{5} \times 340 = 136$d.;
$140 - 136 = 4$d., loss, *Ans.*

(71)

He gained but 4 ft. every day, except the last, when he gained 8 ft., or an excess of 4 ft.;

Then $20 - 4 = 16$ ft., and 16 ft. $\div$ 4, the number daily gained, gives 4 days, *Ans.*

(72)

There will be as many cubic yards in the wall as $10 is contained times in $406 = 40.6 cu. yd. The solid measure, divided by the product of the length and thickness, will give the height.

$40.6 \div (14\frac{1}{2} \times \frac{7}{10}) = 4$ yd. $=$ 12 ft. $=$ height, *Ans.*

(73)

$$225 \times 160 \times .06 = \$2160; \quad 2160 \times .02 = \$43.20;$$
$$2160 - 43.20 = \$2116.80; \quad 2116.80 \times .20 = \$423.36, \textit{ Ans.}$$

(74)

$$\overline{40}^2 + \overline{30}^2 = 2500; \quad \sqrt{2500} = 50 \text{ ft.}, \textit{ Ans.}$$

(75)

According to the terms of the question, the mother was to have twice as much as the daughter, and the son twice as much as the mother; or the daughter was to have $1 as often as the mother had $2, and as often as the son had $4: therefore, the property should be divided into 7 parts, of which the son had $\frac{4}{7}$, the mother, $\frac{2}{7}$, and the daughter, $\frac{1}{7}$.

$\frac{4}{7}$ of 5460 = $3120, son's share;
$\frac{2}{7}$ of 5460 = $1560, mother's share;
$\frac{1}{7}$ of 5460 = $780, daughter's share.

(76)

8 ft. = 96 inches; $\overline{96}^2 = 9216$; $9216 \times .7854 = 7238.2464$, area of base; $7238.2464 \times 72 = 521153.7408$, which is the volume, in cubic inches. The hogshead = 14553 cubic inches; hence, $521153.7408 \div 14553 = 35.8107 +$, *Ans.*

(77)

The difference between the two ages is 24 years. Since the greater age must be 9 times the less, 24 years must be 8 times the less.

$\frac{1}{8}$ of 24 = 3 years = the less age;

When B is 3 years old, A is 27 years old; therefore, it is $40 - 27 = 13$ years ago since A was 9 times as old as B.

(78)

A can earn $\frac{1}{20}$ of the sum in 1 day;
A and B together can earn $\frac{1}{6}$ of the sum in 1 day;
$\frac{1}{6} - \frac{1}{20} = \frac{7}{60} =$ what B can earn in 1 day;
$1 \div \frac{7}{60} = 8\frac{4}{7}$ days, *Ans.*

(79)

A and B can do $\frac{1}{6}$ of the work in 1 day; B and C, $\frac{1}{7}$; and A and C, $\frac{1}{14}$. Then by working 2 days each, they will perform $\frac{1}{6} + \frac{1}{7} + \frac{1}{14} = \frac{32}{84}$ of the work; and by working 1 day together they will do $\frac{1}{2}$ of $\frac{32}{84} = \frac{16}{84}$.

$\frac{16}{84} - \frac{1}{6} = \frac{2}{84}$, what C can do in 1 day;
$\frac{16}{84} - \frac{1}{7} = \frac{4}{84}$, what A can do in 1 day;
$\frac{16}{84} - \frac{1}{14} = \frac{10}{14}$, what B can do in 1 day.

$1 \div \frac{4}{84} = 21$ days $=$ A's time;
$1 \div \frac{10}{84} = 8\frac{2}{5}$ days $=$ B's time;
$1 \div \frac{2}{84} = 42$ days $=$ C's time.

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Lessons composed of familiar words grouped with reference to similar signification or use, and correctly spelled, accented, and defined.

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A complete spelling-book for all grades, containing more matter than "Webster," manufactured in superior style, and sold at a lower price—consequently the cheapest speller extant.

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ENGLISH GRAMMAR.

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The theory and practice of teaching grammar in American schools is meeting with a thorough revolution from the use of this system. While the old methods offer proficiency to the pupil only after much weary plodding and dull memorizing, this affords from the inception the advantage of *practical Object Teaching*, addressing the eye by means of illustrative figures; furnishes association to the memory, its most powerful aid, and diverts the pupil by taxing his ingenuity. Teachers who are using Clark's Grammar uniformly testify that they and their pupils find it the most interesting study of the school course.

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Clark's Diagram English Grammar.

TESTIMONIALS:

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In my opinion, it is well calculated by its system of analysis to develop those rational faculties which in the old systems were rather left to develop themselves, while the memory was overtaxed, and the pupils discouraged.

From B. A. Cox, *School Commissioner, Warren County, Illinois.*

I have examined 150 teachers in the last year, and those having studied or taught Clark's System have universally stood fifty per cent. better examinations than those having studied other authors.

From M. H. B. Burket, *Principal Masonic Institute, Georgetown, Tennessee.*

I traveled two years amusing myself in instructing (exclusively) Grammar classes with Clark's system. The first class I instructed fifty days, but found that this was more time than was required to impart a theoretical knowledge of the science. During the two years thereafter I instructed classes only *thirty* days each. Invariably I proposed that unless I prepared my classes for a more thorough, minute, and accurate knowledge of English Grammar than that obtained from the ordinary books and in the ordinary way in from one to two years, I would make no charge. I never failed in a solitary case to far exceed the hopes of my classes, and made money and character rapidly as an instructor.

From A. B. Douglass, *School Commissioner, Delaware County, New York.*

I have never known a class pursue the study of it under a *live* teacher, that has not succeeded; I have never known it to have an opponent in an educated teacher who had *thoroughly* investigated it; I have never known an *ignorant* teacher to examine it; I have never known a teacher who has used it, to try any other.

From J. A. Dodge, *Teacher and Lecturer on English Grammar, Kentucky.*

We are tempted to assert that it foretells the dawn of a brighter age to our mother-tongue. Both pupil and teacher can fare sumptuously upon its contents, however highly they may have prized the manuals into which they may have been initiated, and by which their expressions have been moulded.

From W. T. Chapman, *Superintendent Public Schools, Wellington, Ohio.*

I regard Clark's System of Grammar the best published. For teaching the analysis of the English Language, it surpasses any I ever used.

From F. S. Lyon, *Principal South Norwalk Union School, Connecticut.*

During ten years' experience in teaching, I have used six different authors on the subject of English Grammar. I am fully convinced that Clark's Grammar is better calculated to make thorough grammarians than any other that I have seen.

From Catalogue of Rohrer's Commercial College, *St. Louis, Missouri.*

We do not hesitate to assert, without fear of successful contradiction, that a better knowledge of the English language can be obtained by this system in six weeks than by the old methods in as many months.

From A. Pickett, *President of the State Teachers' Association, Wisconsin.*

A thorough experiment in the use of many approved authors upon the subject of English Grammar has convinced me of the superiority of Clark. When the pupil has completed the course, he is left upon a foundation of *principle*, and not upon the *dictum* of the author.

From Geo. F. McFarland, *Prin. McAllisterville Academy, Juniata Co., Penn.*

At the first examination of public-school teachers by the county superintendent, when one of our student teachers commenced analyzing a sentence according to Clark, the superintendent listened in mute astonishment until he had finished, then asked what that meant, and finally, with a very knowing look, said such work wouldn't do here, and asked the applicant to parse the sentence right, and gave the lowest certificates to all who barely mentioned Clark. Afterwards, I presented him with a copy, and the next fall he permitted it to be partially used, while the third or last fall, he openly commended the system, and appointed three of my best teachers to explain it at the two Institutes and one County Convention held since September.

☞ For further testimony of equal force, see the **Publishers' Special Circular**, or current numbers of the **Educational Bulletin.**

GEOGRAPHY.

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1. **PRACTICAL OBJECT TEACHING.** The infant scholar is first introduced to *a picture* whence he may derive notions of the shape of the earth, the phenomena of day and night, the distribution of land and water, and the great natural divisions, which mere words would fail entirely to convey to the untutored mind. Other pictures follow on the same plan, and the child's mind is called upon to grasp no idea without the aid of a pictorial illustration. Carried on to the higher books, this system culminates in Physical Geography, where such matters as climates, ocean currents, the winds, peculiarities of the earth's crust, clouds and rain, are pictorially explained and rendered apparent to the most obtuse. The illustrations used for this purpose belong to the highest grade of art.

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GEOGRAPHY—Continued.

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7. FORM OF THE VOLUMES AND MECHANICAL EXECUTION. The maps and text are no longer unnaturally divorced in accordance with the time-honored practice of making text-books on this subject as inconvenient and expensive as possible. On the contrary, all map questions are to be found on the page opposite the map itself, and each book is complete in one volume. The mechanical execution is unrivalled. Paper and printing are everything that could be desired, and the binding is—A. S. Barnes and Company's.

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Monteith & McNally's National Geographies.

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From R. A. ADAMS, *Member of Board of Education, New York.*

I have found, by examination of the Book of Supply of our Board, that considerably the largest number of any series now used in our public schools is the National, by Monteith and McNally.

From BRO. PATRICK, *Chief Provincial of the Vast Educational Society of the* CHRISTIAN BROTHERS *in the United States.*

Having been convinced for some time past that the series of Geographies in use in our schools were not giving satisfaction, and came far short of meeting our most reasonable expectations, I have felt it my imperative duty to examine into this matter, and see if a remedy could not be found.

Copies of the different Geographies published in this country have been placed at our command for examination. On account of other pressing duties we have not been able to give as much time to the investigation of all these different series as we could have desired; yet we have found enough to convince us that there are many others better than those we are now using; but we cheerfully give our most decided preference, above all others, to the National Series, by Monteith & McNally.

Their easy gradation, their thoroughly practical and independent character, their comprehensive completeness as a full and accurate system, the wise discrimination shown in the selection of the subject matter, the beautiful and copious illustrations, the neat cut type, the general execution of the works, and *other excellencies*, will commend them to the friends of education everywhere.

From the "HOME MONTHLY," *Nashville, Tenn.*

MONTEITH'S AND MCNALLY'S GEOGRAPHIES.—Geography is so closely connected with Astronomy, History, Ethnology, and Geology, that it is difficult to define its limits in the construction of a text-book. If the author confines himself strictly to a description of the earth's surface, his book will be dry, meager, and unintelligible to a child. If, on the other hand, he attempts to give information on the cognate sciences, he enters a boundless field, and may wander too far. It seems to us that the authors of the series before us have hit on the happy medium between too much and too little. *The First Lessons*, by applying the system of object-teaching, renders the subject so attractive that a child, just able to read, may become deeply interested in it. The second book of the course enlarges the view, but still keeps to the maps and simple descriptions. Then, in the third book, we have Geography combined with History and Astronomy. A general view of the solar system is presented, so that the pupil may understand the earth's position on the map of the heavens. The first part of the fourth book treats of Physical Geography, and contains a vast amount of knowledge compressed into a small space. It is made bright and attractive by beautiful pictures and suggestive illustrations, on the principle of object-teaching. The maps in the second part of this volume are remarkably clear, and the map exercises are copious and judicious. In the fifth and last volume of the series, the whole subject is reviewed and systematized. This is strictly a Geography. Its maps are beautifully engraved and clearly printed. The map exercises are full and comprehensive. In all these books the maps, questions and descriptions are given in the same volume. In most geographies there are too many details and minute descriptions—more than any child out of purgatory ought to be required to learn. The power of memory is overstrained; there is confusion—no clearly defined idea is formed in the child's mind. But in these books, in brief, pointed descriptions, and constant use of bright, accurate maps, the whole subject is photographed on the mind.

The National System of Geography,

BY MONTEITH & MCNALLY.

ITS RECORD.

These popular text-books have been adopted, by official authority, for the schools of the following States, cities, and associations—in most cases for exclusive and uniform use.

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The Society of the CHRISTIAN BROTHERS, representing 40,000 pupils.
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Monteith's Physical & Intermediate Geography.

This is the most recently published of the Geographical Series, and as might have been anticipated, was very warmly received.

TESTIMONIALS IN BRIEF.

The more I examine the better I am pleased.—J. T. GOODNOW, *State Supt. Kans.*
Has no superior as a text-book.—E. J. THOMPSON, *Supt. Fillmore Co., Minn.*
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During the period alluded to, many authors and editors in this department have started into public notice, and by borrowing ideas and processes original with Dr. Davies, have enjoyed a brief popularity, but are now almost unknown. Many of the series of to-day, built upon a similar basis, and described as "modern books," are destined to a similar fate; while the most far-seeing eye will find it difficult to fix the time, on the basis of any data afforded by their past history, when these books will cease to increase and prosper, and fix a still firmer hold on the affection of every educated American.

One cause of this unparalleled popularity is found in the fact that the enterprise of the author did not cease with the original completion of his books. Always a practical teacher, he has incorporated in his text-books from time to time the advantages of every improvement in methods of teaching, and every advance in science. During all the years in which he has been laboring, he constantly submitted his own theories and those of others to the practical test of the class-room —approving, rejecting, or modifying them as the experience thus obtained might suggest. In this way he has been able to produce an almost perfect series of class-books, in which every department of mathematics has received minute and exhaustive attention.

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4th. The officials of the Government use it as authority in all cases involving mathematical questions.

5th. Our great soldiers and sailors commanding the national armies and navies were educated in this system. So have been a majority of eminent scientists in this country. All these refer to "Davies" as authority.

6th. A larger number of American citizens have received their education from this than from any other series.

7th. The series has a larger circulation throughout the whole country than any other, being *extensively used in every State in the Union.*

MATHEMATICS—Continued.

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Church's Elements of Calculus	2 50
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A work especially popular at the South.

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Peck's Ganot's Popular Physics	1 75
Peck's Elements of Mechanics	1 75
Peck's Practical Calculus	1 75

Prof. W G. Peck, of Columbia College, has designed the first of these works for the ordinary wants of schools in the department of Natural Philosophy. The work enjoys a high reputation.

The Mechanics and Calculus are the briefest treatises on those subjects now published. Their methods are purely practical, and unembarrassed by the details which rather confuse than simplify science.

SLATED ARITHMETICS.

This consists of the application of an artificially slated surface to the inner cover of a book, with flap of the same opening outward, so that students may refer to the book and use the slate at one and the same time, and as though the slate were detached. When folded up, the slate preserves examples and memoranda till needed. The material used is as durable as the stone slate. The additional cost of books thus improved is trifling.

Davies' National Course of Mathematics.

TESTIMONIALS.

From L. **Van Bokkelen**, *State Superintendent Public Instruction, Maryland.*

The series of Arithmetics edited by Prof. Davies, and published by your firm, have been used for many years in the schools of several counties, and the city of Baltimore, and have been approved by teachers and commissioners.

Under the law of 1865, establishing a uniform system of Free Public Schools, these Arithmetics were unanimously adopted by the State Board of Education, after a careful examination, and are now used in all the Public Schools of Maryland.

These facts evidence the high opinion entertained by the School Authorities of the value of the series theoretically and practically.

From **Horace Webster**, *President of the College of New York.*

The undersigned has examined, with care and thought, several volumes of Davies' Mathematics, and is of the opinion that, as a whole, it is the most complete and best course for Academic and Collegiate instruction, with which he is acquainted.

From **David N. Camp**, *State Superintendent of Common Schools, Connecticut.*

I have examined Davies' Series of Arithmetics with some care. The language is clear and precise; each principle is thoroughly analyzed, and the whole so arranged as to facilitate the work of instruction. Having observed the satisfaction and success with which the different books have been used by eminent teachers, it gives me pleasure to commend them to others.

From J. O. **Wilson**, *Chairman Committee on Text-Books, Washington, D. C.*

I consider Davies' Arithmetics decidedly superior to any other series, and in this opinion I am sustained, I believe, by the entire Board of Education and Corps of Teachers in this city, where they have been used for several years past.

From **John L. Campbell**, *Professor of Mathematics, Wabash College, Indiana.*

A proper combination of abstract reasoning and practical illustration is the chief excellence in Prof. Davies' Mathematical works. I prefer his Arithmetics, Algebras, Geometry and Trigonometry to all others now in use, and cordially recommend them to all who desire the advancement of sound learning.

From **Major J. H. Whittlesey**, *Government Inspector of Military Schools.*

Be assured, I regard the works of Prof. Davies, with which I am acquainted, as by far the best text-books in print on the subjects which they treat. I shall certainly encourage their adoption wherever a word from me may be of any avail.

From T. McC. **Ballantine**, *Prof. Mathematics Cumberland College, Kentucky.*

I have long taught Prof. Davies' Course of Mathematics, and I continue to like their working.

From **John McLean Bell**, B. A., *Prin. of Lower Canada College.*

I have used Davies' Arithmetical and Mathematical Series as text-books in the schools under my charge for the last six years. These I have found of great efficacy in exciting, invigorating, and concentrating the intellectual faculties of the young.

Each treatise serves as an introduction to the next higher, by the similarity of its reasonings and methods; and the student is carried forward, by easy and gradual steps, over the whole field of mathematical inquiry, and that, too, in a *shorter* time than is usually occupied in mastering a single department. I sincerely and heartily recommend them to the attention of my fellow-teachers in Canada.

From D. W. **Steele**, *Prin. Philekoian Academy, Cold Springs, Texas.*

I have used Davies' Arithmetics till I know them nearly by heart. A better series of school-books never were published. I have recommended them until they are now used in all this region of country.

A large mass of similar "Opinions" may be obtained by addressing the publishers for special circular for Davies' Mathematics. New recommendations are published in current numbers of the *Educational Bulletin.*

HISTORY.

Monteith's Youth's History, ...$ 75

A History of the United States for beginners. It is arranged upon the catechetical plan, with illustrative maps and engravings, review questions, dates in parentheses (that their study may be optional with the younger class of learners), and interesting Biographical Sketches of all persons who have been prominently identified with the history of our country.

Willard's United States, School edition, . . . 1 40
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